



Site Remediation Committee Newsletter

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MESSAGE FROM THE CHAIR

Seth A. Davis
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As this is the first newsletter in my tenure as chair of the Site Remediation Committee, let me take this opportunity to greet all committee members, and to proudly offer to you our issue on the theme of contaminated sediments. Our committee strives to bring together legal and technical expertise and points of view on specific issues in site remediation, and this issue shows how well the concept can work. We are pleased to present (in no particular order), an analysis of natural resource damages claims in sediment sites; a proposal for streamlining the remedial investigation and feasibility study process at sediment sites; a discussion of assigning costs for restoring urban rivers, co-authored by a former Section chair; an analysis of the use of Superfund to deal with contaminated sediments in urban waterways and embayments; and a study of special considerations for conducting remedial investigations at sediment sites.

In the coming year we will be looking into new themes for newsletters. If there is a particular theme of interest to you, please contact me or one of our Newsletter vice chairs, Peter Hapke or Karen Mignone. If you have an article or would like to prepare an article on such a topic, even better! We love volunteers!

We love volunteers and we NEED volunteers to make this committee even more active. If you've got an

interest in getting involved in any of our activities, please contact me or any of our vice chairs. In addition, please be sure to visit our recently updated Web site, which contains, among other things, a wonderful set of links to the site remediation Web sites of all state environmental agencies. This feature, prepared by our Technology vice chair, David Johnson, is a streamlined adaptation of the Section of Environment, Energy, and Resources' State and Regional Environmental Cooperation Committee's Web site, and should be of great use to all of us who practice in this area.

My best to you all, and I hope to see you all involved in committee activities this year!

***ABA Section of Environment, Energy,
and Resources***

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SAVE THE DATES!

**Site Remediation
Committee Newsletter
Vol. 3, No. 1, January 2007
Peter E. Hapke, Co-Editor
Karen Mignone, Co-Editor**

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**KEY TECHNICAL ELEMENTS
FOR CONDUCTING REMEDIAL
INVESTIGATIONS AT
SUPERFUND SEDIMENT SITES**

**Tad Deshler
Kathy Godtfredsen, Ph.D.
Mike Johns, Ph.D.
*Windward Environmental***

A central component of the Environmental Protection Agency's (EPA's) Superfund program is a remedial investigation (RI). The RI is conducted to determine the nature and extent of contamination and the potential health risks to both people and the environment. The RI also establishes risk-based cleanup goals that will be considered in the feasibility study (FS) and by EPA project managers that are tasked with making a cleanup decision. EPA (1988) guidance for conducting RIs is almost 20 years old, but is still relevant today. However, sediment sites, particularly in large river systems, present unique challenges with respect to site characterization and risk assessment compared to upland soil sites. The river system supports highly mobile aquatic organisms, and is a dynamic environment that can greatly affect the contaminant distribution and the potential for recovery through natural processes. The 1988 guidance only briefly addressed sediment sites; more recent contaminated sediment remediation guidance prepared by EPA (2005) has provided valuable supplemental information. This article summarizes some of the key technical elements that may be included in an RI for a sediment site that may be less important or nonexistent at an upland site.

Fish/shellfish Consumption

Risk assessments conducted as part of the RI include an evaluation of risks from different exposure scenarios for both people and animals. An exposure pathway includes the contaminated medium (*e.g.*, sediment, water or tissue) and a mechanism by which the person or animal comes into contact with that medium (*e.g.*, diet, swimming). The importance of a particular pathway is dependent on the type of contamination present as well as the habits of the exposed population.

For example, at sites with contamination from chemicals that are persistent and accumulate in tissue (such as PCBs), risks associated with fish/shellfish consumption are generally much higher than risks from recreational activities such as swimming.

Within the Pacific Northwest, different people consume different types of fish and shellfish at different rates, ranging from no consumption to one or meals every day. A series of fish and shellfish consumption surveys conducted in the last 15 years indicated that Native Americans and other immigrant populations may consume more fish and shellfish than the general public (Toy et al. 1996; EPA 1999; CRITFC 1994; Adolfson 1996; Suquamish Tribe 2000). These populations are frequently included in human health risk assessments, in keeping with EPA's preference for evaluating the exposure for the most highly exposed individuals. These consumption surveys include details on the preparation methods (*e.g.*, fillet) and species consumed. The availability of such detailed data on consumption has made it possible to construct different exposure scenarios that reflect the range of fish/shellfish types that people eat.

Bioaccumulation Modeling

One of the more challenging aspects of determining where to perform remedial actions is setting realistic target cleanup goals when risks result from an indirect exposure to sediment, such as risks associated with the consumption of fish/shellfish. While risks arise from consuming fish and shellfish, it is not practical to develop a goal that actively cleans fish; rather the cleanup goals must be set for the media responsible for the unacceptable tissue concentrations found in fish and shellfish. It is logical to assume that reducing the chemical concentrations in sediment will reduce the chemical concentrations in fish and shellfish, but quantitative modeling is often required by the regulatory agencies to better define cleanup goals. A variety of bioaccumulation models have been developed to evaluate this relationship. This type of modeling is currently being employed at the two largest sediment Superfund sites in the Pacific Northwest, the Lower Duwamish Waterway in Seattle, Washington (Windward 2005c, 2005b, 2005a) and the Lower

Willamette River in Portland, Oregon (Windward 2005d, 2004), and is typically included in sediment Superfund sites in other parts of the United States, such as the Fox River in Wisconsin (QEA 2001) and the Hudson River in New York (QEA 1999).

Fish and shellfish that are consumed by people and wildlife may range over an area that is larger than the sediment site under evaluation. If the range is larger, various techniques are necessary to correctly estimate the exposure environment for the species to be modeled because they may spend a considerable amount of time in areas that have not been well characterized. If the range is smaller but not well known, a series of alternate assumptions of exposure area can provide valuable information depending on the data density within the site. Fish and shellfish consumption, and the bioaccumulation modeling that is often made necessary by this exposure pathway, are often important components of an RI at a sediment site. These topics are not discussed in detail in the recent EPA (2005) guidance on contaminated sediment, but are critical when evaluating what areas may warrant remedial actions in order to reduce risk.

Sediment Stability and Transport

Another important aspect of assessing risks at sediment sites is understanding the stability of the sediment and the associated chemical contamination. This topic is covered in detail in the recent EPA (2005) guidance on contaminated sediment and a sediment stability analysis, at some level of detail, will be required at all sediment sites in the future. Sediment sites represent dynamic environments compared to soil sites given the presence of moving water, which can have profound physical effects on the sediment characteristics (causing erosion of the surface sediments, or depositing sediment from upstream sources that bury the existing sediment surface). The transport of sediments, both from within and outside the site, can greatly affect future exposure and risk for both people and animals. Understanding sediment stability and the magnitude of sediment transport are important both when assessing baseline risks (risks associated with exposure to existing surface sediments, and potential exposure to sediments buried at depth

that could be exposed during an erosional event) and determining the potential for monitored natural recovery (the burial of contaminated sediments by cleaner sediment due to sediment transport and deposition) as a viable remedial alternative.

An evaluation of sediment stability and transport typically includes an understanding of how historical events (river flow, construction of dams or major water diversions upstream of the site) are responsible for the current nature and extent of contamination. Similar evaluations, which require modeling, are conducted to predict future transport and exposure, especially if monitored natural recovery is being considered as a viable remedial alternative.

Several technical approaches are available to assess sediment stability and transport, ranging from simple approaches based on limited collection of field data to assess deposition and erosion to more complex approaches that involve numeric modeling. The intensity of the data collection activities and the complexity of any modeling will be dependent on the hydrodynamics of the water body, the acceptable uncertainty of model results, and the relative importance of the results in making risk management and remedial action decisions.

Watershed Context

Contaminated sediment sites are connected to other natural features in the watershed that must be considered during the RI, as discussed in the recent EPA (2005) guidance document on contaminated sediment. The contaminated water body may serve important functions in the watershed, such as providing critical habitat or flood control. Some sediment sites are located in watersheds with many historical and ongoing point and non-point contaminant sources. Site characterization strategies must be carefully designed at these sites so that any necessary remediation and source control can be appropriately targeted.

At many sediment sites, it is especially important to consider background chemical concentrations when developing remedial objectives, especially upgradient of the site. An incremental risk approach can be used,

following EPA (2002) guidance, to compare risks within the site to risks in background areas. The difference between the two risk estimates is the incremental risk attributed to the site. EPA recognizes that it is impractical to cleanup the site to concentrations less than those found in background areas. Therefore, cleanup targets may be set equal to background, rather than risk-based targets, which may be much lower than background.

Conclusions

Sediment sites present unique challenges with solutions that are often site-specific. Applying the best combination of techniques requires a multidisciplinary approach based in science with a reasoned communication approach among all parties.

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STREAMLINING THE RI/FS PROCESS FOR SEDIMENT SITES

Ian Richardson
Steve Quigley
Jeff Daniel

Conestoga-Rovers & Associates (CRA)

The typical RI/FS is a multi-year, expensive, process-oriented investigation. How can this process be made more results-oriented? Streamlining an RI/FS for sediment projects can be achieved by incorporating streamlining concepts into each of the four major stages of an RI/FS project; including scoping, site characterization, baseline risk assessment (BRA) and feasibility study (FS).

In a streamlined RI/FS, the conceptual site model (CSM) and preliminary remedial action objectives can be based on a focussed group of remedial alternatives that are most practicable for the site and that have been successfully implemented at other sites.

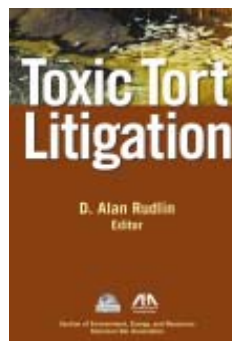
An iterative approach to site characterization results in the collection of only the necessary data. Limited preliminary field investigations can assist in scoping future work, as can limiting the collection of data to the extent needed to evaluate the focussed group of remedial alternatives. Information on surface water hydrology, erosional and/or tidal forces, and sediment depositional patterns and sediment characteristics should be obtained early in the investigation and incorporated into the CSM. Information such as sediment stability, grain size and organic content can be utilized to focus subsequent investigative tasks.

The BRA can be streamlined by adopting what is in essence a presumptive remedy approach, recognizing that remedial options are generally limited for contaminated sediment sites. These options may be further limited by the characteristics of a particular site and the RI data may render a comprehensive quantitative risk assessment unnecessary. At most sediment sites, ecological risk can be readily determined to be the driver for remedial activities. At such sites, the scope of investigation and the BRA can be reduced accordingly. The CSM can be used

together with the RI data to identify the contaminants of concern in the affected media, their concentrations and their hazardous properties, which may pose a risk through the various routes of exposure. Pathways that are an obvious threat to human health and the environment can be identified by comparing RI data to chemical-specific criteria, and where these criteria are clearly exceeded in a given medium, remedial action is generally warranted. This streamlining approach may also prompt early action on the most obvious site issues while analyses continue on other issues.

The FS can be streamlined by considering a focused list of alternatives: natural recovery, passive capping, reactive capping and dredging. These are the most practicable remedial alternatives for contaminated sediments. Disposal alternatives for dredged materials may include open water disposal, placement in a confined disposal unit or placement in an upland disposal area. Ensuring that site investigations provide information necessary to properly evaluate these approaches can significantly reduce the time necessary to complete the RI/FS process.

Another method of streamlining the completion of sediment projects is to avoid completing the RI/FS under a Remedial Action process and instead conduct an Engineering Evaluation/Cost Analysis (EE/CA) under a Removal Action. The EE/CA can be a more streamlined, results-oriented approach to evaluating a site.



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NATURAL RESOURCE DAMAGE CLAIMS AT SEDIMENT SITES

Lisa Saban
Mike Johns

Windward Environmental

Natural resource damage (NRD) claims are brought by trustees for injuries to natural resources caused by the unpermitted release of a hazardous substance or oil. Claims are made based on an assessment of the degree to which natural resources have been injured, and require a causal link between the unpermitted release and the injured resource. While trustees have brought claims at a wide variety of hazardous waste sites, a majority of the current claims are for injuries to the groundwater resource (*e.g.*, recent larger number of claims made by the state on New Jersey acting as trustee for the groundwater resource) and at sediment sites, where some of the hazardous substances resulting from historic releases are present in the sediment.

Sediment sites are often complex, with multiple contaminants, a combination of current and historic contamination, dynamic systems, and multiple sources and multiple stakeholders. For this reason, conclusions from site investigations can have high uncertainty unless considerable time and scientific effort is expended to identify the chemicals of concern and their source. Many times, the original sources can not be identified since the contamination is widespread and the contaminants (such as PCBs, hydrocarbons and metals) similar to general urban inputs to the system. For these reasons, NRD assessments at sediment sites, which require a causation link between a release and a quantifiable injury, can be controversial. Due to the high degree of interest in resource use, combined with multiple contaminants in a dynamic system, resolving NRD claims at large sites is complex.

The ability to make a clear causation link between a release and a quantifiable injury is difficult at a sediment site for a number of reasons. Waterways have been used historically as a convenient discharge point for industrial and urban wastes, and that the practice of discharging wastes to water has gone on, in some

instances, for well over 100 years. As a consequence, contaminants discharged to a water body often became attached to sediment particles and settled to the bottom of the waterway. These sediments then become a reservoir that can serve to continue to serve as a pathway of exposure to aquatic organisms. At most aquatic sites, the majority of the assessment effort is in determining resource injuries associated with this legacy contamination rather than any current, ongoing releases. Adding to the complexity of quantifying NRD injuries is the fact that many aquatic species are mobile, moving freely throughout the water body making it more difficult to link a particular release. In addition, for many aquatic organisms exposure to sediment is not direct, but rather through the consumption of food. Food web analysis needed to establish the indirect link between exposure to sediment, tissue body burdens and injuries can be highly uncertain and lead to significant disagreements between parties seeking to resolve a NRD claim. Finally, NRD regulations require that baseline conditions be taken into account when quantifying resource injuries. Baseline conditions are often referred to as the “but for” conditions, in which trustees have to account for the status of a resource and the services provided by that resource that are associated with habitat conditions and other factors that are not associated with the release of a hazardous substance. In many urban waterways, urbanization and industrialization of the area resulted in significant modifications of the shoreline and water areas (filling of wetlands, dredging and channelizations, construction of dams to control water flow) that were concomitant with releases of hazardous substances. Quantifying injuries that are associated with these “but for” conditions and the significance of the baseline conditions in the final quantification of injuries also can lead to significant disagreements between the parties.

While the original scheme for settling NRD claims leaned towards a litigation-based approach in which the claim would be determined through trial, or settlement prior to trial, the recent trend has been to attempt settlement through a cooperative assessment process, followed by a negotiated settlement. Such a trend can be beneficial to those seeking a timely resolution of a NRD claim, especially at sediment sites where the uncertainties associated with the assessment




and quantification of injuries might be better accounted for through mutual agreement than through an extensive, and expensive development of empirical data and analysis. Also, the trend has been to settle claims through the direct construction of restoration projects by the responsible parties, rather than through the payment of cash to trustees, who then in turn must put the funds towards restoration. This shift in emphasis towards the immediate construction of restoration projects has also served to accelerate settlements at sediment sites.

These changes in approaches to resolving NRD claims has occurred because it promotes more efficient implementation of restoration projects, and decreases transaction costs. This approach for settling claims is especially well-suited for sediment sites, where changes in bank configuration or other physical changes in bank structure and near shore water depth can allow for enhanced habitat value. The construction of restoration projects has been fostered as a means of settling NRD liability for several reasons, including the desire by trustees to assure that more habitat is restored than might be otherwise obtained through alternative settlement structures. Restoration-based settlements result in habitat restoration projects being constructed sooner, often with construction being coordinated with, and incorporated into, cleanup projects.

Instead of using the Department of Interior's NRD regulations to assess injuries and establish their claim, they have relied on habitat service models, such as the Habitat Equivalency Analysis (HEA) model, to negotiate settlements. While not discussed in the Type B regulations, the application of habitat service models as tools for assessing injuries and determining compensation based on restoration projects is presented in the National Oceanic & Atmospheric Administration (NOAA) Oil Pollution Act regulations. Using habitat models, trustees make claims for resource injuries based on restoration projects, rather than based on cash. At settlement, responsible parties then have the option of undertaking a defined restoration project, or paying the trustees an amount of money equivalent to doing the project. The HEA model represents a fundamental shift in the way in which trustees approach NRD claims in that it:

- Uses loss of services provided by habitat as a surrogate for losses of services provided by individual natural resources
- Provides a "currency" for defining losses and gains in resource services based on habitat losses and restoration
- Places the emphasis for settling a NRD claim on habitat, rather than dollars.

The trend towards the application of models such as HEA and the general desire to seek settlement through cooperation has lead federal trustees to foster a more cooperative approach and to consider restoration opportunities to settle multi-party claims. This approach has been received favorably by many companies with potential for NRD claims, since this offers an avenue for resolving claims more effectively and with a positive, visible outcome for all parties involved. As a result, both potentially responsible parties and the trustees have been working together to better outline processes for both cooperative assessments and maximizing the resource value provided by restoration.



Site Remediation
Committee Newsletter

LIKE TO WRITE?

The Site Remediation Committee welcome the participation of members who are interested in preparing this newsletter.

If you would like to lend a hand by writing, editing, identifying authors or identifying issues, please contact one of the co-editors: Peter Hapke at peter@hapkelaw.com or Karen Mignone at kmignone@pepehazard.com.

WHO SHOULD PAY FOR RESTORING URBAN RIVERS?

Jonathan P. Deason, Ph.D., P.E.
Carol E. Dinkins, Esq.

Introduction

In response to rising national concerns over degraded urban rivers, the U.S. Army Corps of Engineers and the U.S. Environmental Protection Agency (EPA) signed Memoranda of Understanding in 2002 and 2005 establishing a new approach to urban river restoration. This new program, called the Urban River Restoration Initiative (URRI), integrates the respective agency authorities under the Water Resources Development Acts (WRDA) and the Comprehensive Environmental Response, Liability, and Compensation Act (CERCLA) into a cooperative program based on public works investment combined with financial contributions by potentially responsible parties (PRPs).

Under the URRI, solutions to degraded urban rivers are being devised using a benefits-based approach (seeking the greatest net economic, environmental and human health benefits of river restoration actions as compared to the costs of such actions), subject to CERCLA constraints. It is envisioned that the cost-sharing formulas embodied in WRDA will be used to calculate respective federal and non-federal cost shares, with PRPs picking up the non-federal shares. Given the notion of “polluter pay,” PRPs would be expected to contribute resources commensurate with their individual levels of responsibility for sediment contamination, but not necessarily to assume the joint and several liability for costs stemming from the acts of others.

Is this a reasonable approach? This question can be examined from both empirical and historical perspectives.

Empirical Perspective

A recent study of two dozen federal programs sharing characteristics with the URRI (Deason, et al., “Restoring Degraded Urban Rivers: To Whom Should

We Look for Payment?” FED. FACILITIES ENVTL. J., Spring 2006) found that expediency was the most significant driver of decision-making in the programs reviewed. The study observed a general recognition among these programs that complex problems caused by human interactions with the environment can be achieved best through cooperative, cost-shared initiatives that seek to involve all interested parties, and that disincentives to such cooperation should be minimized to the degree that such can be done without sacrificing economic efficiency and equity.

Historical Perspective

The empirical result summarized above is consistent with historical underpinnings of the “polluter pays” policy, which can be traced back to a variety of sources, including the toxic tort liability theories of Great Britain, a 1968 Council of Europe policy that a polluter should pay all “the economic and social costs generated by pollution until it modifies its activities,” a 1969 Dutch water pollution law under which surface water supervisors were given the right to impose fines on polluters, 1972 OECD “Guiding Principles Concerning International Economic Aspects of Environmental Policies” and U.S. case law such as *U.S. vs. Canada* (Trail Smelter Case). None of these historical underpinnings of the “polluter pays” policy applied responsibility for ancient contamination events or non-operating sites to current operators, or otherwise undermine considerations of expediency and economic efficiency.

When Congress enacted CERCLA in 1980, the Ways and Means Committee confirmed that it “recognizes that the United States Government must bear some of the costs incurred for this purpose,” acknowledging that the public benefit from industrial production warrants some public sharing in the cost of responding to historical pollution and that the sheer magnitude of cleanup obligations may deter PRPs from participating voluntarily in remediation projects. (In general, CERCLA legislative history acknowledges that the public at large has benefited from industrial development and in fact encouraged many of the waste practices that contributed to today’s problems.)

Cost Assignment under the URRI

Cost assignment calculations under the URRI will be undertaken according to a three-phased approach involving cost allocation, cost sharing and cost distribution. While the details of such steps are beyond the scope of this article, the extensive experience of the Corps of Engineers in using such processes demonstrates that such procedures can not only facilitate expediency in deriving and implementing solutions to urban river restoration challenges, but also equitable and efficient resource management. These procedures, along with the benefit-based planning procedures mentioned above, provide a vehicle to implement projects expeditiously and in a manner that generates benefits with value greater than the costs of the projects, and without having to address the myriad transactional and legal issues and delays typically associated with litigation-driven approaches.

Conclusion

The bottom line is that the project analytical mechanisms and cost assignment procedures that have been developed under WRDA, combined with EPA's enforcement powers under CERCLA, properly blend "public works" and "enforcement" approaches that can facilitate effective and timely restoration of our nation's degraded urban rivers, as opposed to the wasteful confrontations and delays that have typified large and complex CERCLA driven responses.

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CONTAMINATED SEDIMENTS IN URBAN WATERWAYS AND EMBAYMENTS: HOW BEST TO USE SUPERFUND

Thomas A. Newlon
Stoel Rives LLP

A river runs through most, if not all, of the nation's major urban areas. And coastal population centers frequently have significant port facilities with associated industrial development along commercial waterways, bays and harbor areas. Invariably, these water bodies have received many decades of stormwater, industrial and other discharges from a myriad of both point sources and non-point sources. Contamination from these discharges settles out into the sediments of the receiving waters and accumulates over the years. Urban bays and waterways are truly at the end of the pipe—water runs downhill and thus all the contamination picked up or discharged into such waters ends up primarily in the sediments of urban bays and waterways.

Federal, state and local agencies have for many years sought to clean up urban waters. These entities employ a wide variety of programs, ranging from federal Clean Water Act permits for industrial point sources to local source control efforts to reduce pollutant inputs from the entire range of human endeavor in urban areas. These efforts are generally targeted at ongoing discharges and seek to clean up a bay or river by controlling new pollutant inputs. Seen from the perspective of someone who remembers the Cuyahoga River conflagration, these efforts have accomplished much. Seen from the perspective of federal Superfund human health and ecological risk assessments and all standards that could be considered "applicable or relevant and appropriate requirements," there is an extremely long way to go.

We are now well into the third decade of the federal Superfund program. Superfund has, from its earliest years, addressed contaminated sediment sites. In the early years, however, these sites were largely driven by a small number of upland industrial facilities with contaminated adjacent sediments. In instances such as New Bedford Harbor and the Fox River, those

contaminated sediments stretched over a very large area. In other instances, contaminated sediments were one component of a facility's cleanup that included other media as well.

Over the past 10 years or so of the Superfund program, the Environmental Protection Agency (EPA) exercised its discretion to select large stretches of urban waterways and embayments for inclusion on the National Priorities List (NPL) in order to address sediment contamination in a comprehensive fashion. These areas generally include a large number of adjacent upland facilities that contributed at least some amount of contamination to the waterway or bay through point source discharges. Because these sites are generally in more urban areas, stormwater and non-point pollution issues are a problem as well, both historically and currently.

The Advantages to EPA of Using Superfund for Contaminated Sediment Sites

Superfund's differences from other regulatory programs make it an attractive option for contaminated sediment sites:

1. Funding Sources. Superfund's liability scheme generally creates a large number of potential funding sources for sediment site investigation and cleanup. At sediment sites that cover a large geographic area, such as an industrial waterway that is miles long or an entire harbor area, the number of potentially responsible parties (PRPs) that could be held responsible is limited only by the resourcefulness, imagination and persistence of investigators looking into current and past property uses at locations that drain into the waterway or bay.

2. Payment of Program Costs. PRPs must not only pay for site investigation and cleanup, they must also pay for agency oversight and process costs. This allows an agency to launch what could turn into an eight-figure process (the RI/FS) with a nine-figure outcome (the ultimate remedy) using a relatively limited initial commitment of agency resources. The agency can use outside contractors to supplement agency staff resources at a complex and difficult site, with both the

staff and contractors largely funded by the PRPs. Other regulatory programs that may apply to contaminated sediments sites, such as the Clean Water Act, lack this financing mechanism.

3. Comprehensiveness. Superfund provides a program that can and does address impacts to all media from both past and current activities. It does not sit in a medium-specific or substance-specific "silo" as do many other environmental programs. This is because Superfund is fundamentally remedial and liability-based, rather than being a comprehensive regulatory scheme for a particular medium (*e.g.*, air or water), or for a particular type of material (*e.g.*, hazardous waste or toxic substances in commerce). Superfund's versatility makes it a very attractive option for addressing areas with multiple contaminant sources.

4. Preserving Natural Resource Damage (NRD) Claims. Use of Superfund is viewed as necessary at some sites due to the consequences of *not* using Superfund authorities. Specifically, natural resource damage claims that may be worth tens of millions of dollars may be lost for contaminated areas where the statute of limitations has arguably run. By listing an area as a federal Superfund site, EPA can essentially reset the statute of limitations on behalf of the natural resource trustees, as Comprehensive Environmental Response, Liability, and Compensation Act (CERCLA) provides a different limitations period for NPL sites.

Given all of the above advantages, it is no wonder that agencies are attracted to Superfund as a basis for approaching large geographic areas that have significant sediment contamination issues. However, these advantages come at a price that is paid both by the regulators and the responsible parties.

Superfund is Not the Optimal Regulatory Program for Large Contaminated Sediment Sites

Superfund is renowned for its long timelines and high transaction costs. These problems stem from the same characteristics that make Superfund very attractive as a tool to address large contaminated sediment sites:

1. Liability is Not Limited. Any and all PRPs can, at least in theory, be made to pay 100 percent of the costs of whatever studies and cleanup are deemed warranted. Consequently, there is not the same incentive to hold down costs as in more traditional regulatory programs where the agency pays much or all of its own costs. Asking for additional studies or evaluations, or additional stakeholder process, can be a burden on EPA but not to the same degree as it would be were the agency paying its own costs.

2. Comprehensive = Upward Transaction Cost Pressure. Superfund has a reputation for being a black hole of process and transaction costs. Whether that reputation is deserved or not can be debated, but there is no denying that Superfund's application brings with it very significant transaction costs related to interactions between EPA and the responsible parties as well as costs arising from interactions between and among the responsible parties themselves. PRPs have ample incentive to try to hold down cleanup costs and to try to hold down their individual share of those costs. With those incentives working on a large number of PRPs across the very long time frame needed for decision making at most sites, transaction costs are invariably high.

The characteristics of Superfund that push the process towards high overall transaction costs are especially prevalent at sediment sites that cover a large geographic area, such as a major industrial waterway or an urban harbor area. The number of PRPs can be extremely high because, as stated earlier, water runs downhill. A major urban waterway or bay will generally be downstream of a large number of parties that EPA will allege released contamination to the water at some point in the past. With a large number of PRPs comes a large number of potential interactions between and among PRPs, and it becomes increasingly difficult and costly to manage PRP interactions with EPA and the various involved stakeholders.

Large sediment sites that are not linked to a single facility or type of facility also tend to involve a variety of contaminant inputs. A large number of diverse inputs results in a greater number of potential contaminants of concern and consequently increased

interaction among all involved parties. As the overall size of a sediment site increases, there is exponentially more to be studied and thus greater difficulties in managing the studies and evaluations that precede actual cleanup. This dynamic contributes to the especially high transaction costs at some sediment sites.

3. A large number of PRPs are present. Large aquatic sites in urban areas will generally involve a large number of PRPs. Certain PRPs may be tied closely to certain of the area's hotspots, but when the site encompass a large geographic area those PRPs can end up being responsible for, and participating in, all of the process and decision-making surrounding the much-larger site as a whole.

An Alternative Approach for Large Contaminated Sediment Sites

Absent extraordinary circumstances, such as a small number of PRPs that volunteer to carry out the RI/FS and complete most or all of the ultimate remedial actions, contaminated sediment Superfund sites will most likely be disproportionately expensive and difficult to deal with for all parties. When EPA is faced with a potential listing of this type, the agency should consider the following phased approach that could both reduce transaction costs and expedite cleanup of the site:

1. Conduct an extensive pre-listing evaluation of risk reduction options. The area in question may or may not have sufficient available data to evaluate whether significant hotspots exist that could be addressed as independent smaller sites. If sufficient data is not available, the agency should consider requesting that PRPs gather additional data for what amounts to an enhanced site assessment. EPA could also obtain input from other stakeholders regarding potential contamination and risks associated with the area.

Normally, pre-listing site assessments are performed with whatever existing data is available. In this instance, however, focused additional sampling and information gathering could allow the agency to zero in on the highest risk portions of a large geographic area

and seek expedited remediation of those areas from a smaller subset of PRPs than would be involved were the entire area to be listed as a Superfund site. Prudent PRPs would see the value of cooperating in pre-listing site evaluation work in order to potentially head off listing of an entire large geographic area on the NPL.

2. Expedite remediation of areas that clearly need cleanup. Once data has been assembled and hotspots have been identified through an enhanced site assessment process, EPA would have the choice of scoring the entire large geographic area for potential inclusion on the NPL or pausing to see if PRPs are willing to step up to perform expedited remediation on those hotspot areas that clearly pose significant risk. As with the enhanced site assessment work, PRPs will be motivated to address smaller areas for which they are more clearly responsible in order to avoid the potential transaction cost and remediation quagmire that might attend the listing of a large geographic area of sediment.

3. Enhance pre-listing coordination with stakeholders. The National Contingency Plan requires very little public involvement for a Superfund removal action at a non-listed site. Nonetheless, EPA would be prudent to engage stakeholders prior to its approval of pre-listing hotspot cleanups. This will ease concerns that EPA is sweetheart dealing its way out of the hard work involved with a major new sediment site listing. These interactions would follow up on the outreach done during the enhanced site assessment.

4. Reserve NPL consideration until agreed-to hotspot work is carried out. It may be that PRPs will not address known hotspots, or they may be addressed and the site as a whole may still possibly present unacceptable risks. In either of those events, EPA should evaluate the extent to which listing of the site is necessary in light of other available authorities.

Listing of either all or some portion of the overall geographic area may be needed whether or not some of the known hotspots are addressed earlier. However, if significant pre-listing work has been completed, the scope of the listing and the number of

PRPs may be substantially reduced. Reduction in the geographic extent of the listing, the number of PRPs and the number of sources that need to be addressed will go a long way towards simplifying evaluation and remaining remediation of the site and will substantially reduce timelines and overall process costs. If those reductions in scope have occurred because of earlier, more focused investigation and remediation, the environment will benefit from more expedited remediation of the worst of the contaminated sediments, EPA will be able to do more with the Superfund program (*i.e.*, opportunity costs will be reduced) and responsible parties will be burdened with fewer transaction and process costs.

What Happens Next?

Major Superfund sites that are made up almost exclusively of large geographic areas of contaminated sediments are not a staple of the Superfund program. However, two such sites were listed in the Northwest early in this decade, and another has been wending its way through the Superfund process for well over 20 years. EPA does not appear to be in a hurry to regularly list sites of this type, perhaps due to the drain on resources these sites entail. However, many potential listings of this type exist in urban coastal areas. The Northwest experience with large sediment sites suggests that an alternative to the standard EPA approach could produce cleanup results much faster and at lower overall cost. Small can perhaps be beautiful when it comes to sediment remediation.

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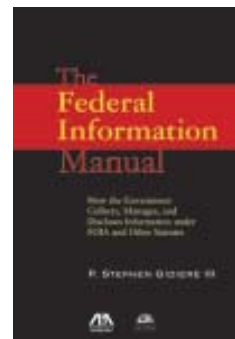
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