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U.S. Environmental Protection Agency

Contaminated Sediments in Superfund

Goals and Overview
List of Sediment Sites
Guidance Documents, Fact Sheets and Policies
Contaminated Sediments Technical Advisory Group (CSTAG)
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Contaminated Sediments Technical Advisory Group (CSTAG)

The Contaminated Sediments Technical Advisory Group (CSTAG) was established as a technical advisory group to monitor the progress of, and provide advice regarding, a small number of large, complex, or controversial contaminated sediment Superfund sites.

CSTAG Purpose

1. To help Remedial Project Managers (RPMs) and On-Scene Coordinators (OSCs) of a select number of large, complex, or controversial sediment sites appropriately investigate and manage their sites in accordance with the 11 risk management principles.
2. To encourage national consistency in the management of sediment sites by providing a forum for exchange of technical and policy information.
3. To provide a mechanism for monitoring and evaluating the progress at a number of the largest or most complex contaminated sediment sites.

Some documents below are in PDF format. For information on PDFs, please click on the "About PDF" icon. About PDF

- CSTAG Operating Procedures (28 KB, 3 pages)
- List of CSTAG Sites
- OSWER Directive 9285.6-08, Principles for Managing Contaminated Sediment Risks at Hazardous Waste Sites (Signed Feb. 12, 2002) (70 KB, 11 pages)

Last updated on Tuesday, October 21st, 2003
URL: http://www.epa.gov/superfund/resources/sediment/cstag.htm

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List of CSTAG Sites

The EPA has identified the following sites as those that warrant review by the CSTAG because they are large, complex, or controversial. No quantifiable criteria were used to develop this list. This list will grow as more sites are listed on the NPL or as additional information becomes available on sites undergoing investigation.

As the CSTAG reviews each site, links to the CSTAG's recommendations for the site and the Region's response to the recommendations will be posted below. These documents will also become part of the administrative record for the site.

Some documents below are in PDF format. For information on PDFs, please click on the "About PDF" icon. About PDF

- **Allied Paper/Portage Creek/Kalamazoo River, Kalamazoo, MI**
  - CSTAG's Recommendations for the Kalamazoo River Site (95 KB, 4 pages)
  - Regional Response to CSTAG's Recommendations (523 KB, 12 pages)
- **Ashland/Northern States Power Lakefront, Ashland, WI**
  - CSTAG's Recommendations for the Ashland Site (90 KB, 4 pages)
  - Cover Letter for the Regional Response to CSTAG (21 KB, 1 page)
  - Regional Response to CSTAG's Recommendations (241 KB, 11 pages)
- **GE-Housatonic/Rest of River, Pittsfield, MA and western MA and CT**
  - CSTAG Recommendations on the Housatonic Rest of River Site (102 KB, 5 pages)
  - Regional Response to CSTAG's Recommendations (60 KB, 8 pages)
- **Palos Verdes Shelf, Los Angeles, CA**
  - CSTAG Recommendations on the Montrose/Palos Verdes Shelf Site (65 KB, 5 pages)
  - Regional Response to CSTAG's Recommendations (89 KB, 12 pages)
- **Portland Harbor, Portland, OR**
  - CSTAG Recommendations on the Portland Harbor Site (243 KB, 5 pages)
  - Regional Response to CSTAG's Recommendations (63 KB, 10 pages)
- **Lower Duwamish Waterway, Seattle, WA**
  - CSTAG Recommendations on the Lower Duwamish Waterway Site (242 KB, 5 pages)
  - Regional Response to CSTAG's Recommendations (54 KB, 8 pages)
- **Kanawha River, Charleston, WV**

Operating Procedures for EPA's Contaminated Sediments Technical Advisory Group (CSTAG) - Updated 3/15/2004

Background

OSWER Directive 9285.6-08, *Principles for Managing Contaminated Sediment Risks at Hazardous Waste Sites* (Feb. 12, 2002), established the CSTAG as a technical advisory group to "monitor the progress of and provide advice regarding a small number of large, complex, or controversial contaminated sediment Superfund sites."

Purpose of the CSTAG

- To help RPMs and OSCs of a select number of large, complex, or controversial sediment sites appropriately investigate and manage their sites in accordance with the 11 risk management principles.

- To encourage national consistency in the management of sediment sites by providing a forum for exchange of technical and policy information.

- To provide a mechanism for monitoring and evaluating the progress at a number of the largest or most complex contaminated sediment sites.

Membership

CSTAG membership includes one representative per Region (except that some Regions may have an alternate), two from ORD, and two from OSRTI. The current list of members is presented below. Members are expected to participate in monthly conference calls and approximately four meetings per year, each lasting 2-3 days. Many of these meetings will include site visits, which may involve extra travel time. The representative for the Region in which a site is being visited is expected to make arrangements for hotel rooms and meeting space. Each member's Region or Office is expected to pay all travel costs, which can be charged to site-specific accounts. The group, at least initially, will have two co-chairs, one from a Region and one from Headquarters. The Regional co-chair position will rotate among the Regions and the length of service will normally be one year. Membership entails a significant time commitment, especially when a member is preparing for a meeting to be held in his or her Region.

Meetings

The RPM (or OSC) will be notified of the planned CSTAG meeting by the regional member approximately three months prior to the proposed date for the meeting. The date for the meeting will be set after consultation with the lead state or DOD RPM if the site is not an EPA-lead site. The initial meeting for each site will be near the site and will include an overview of the site by the lead RPM that focuses on how the RPM is considering the 11 principles. This part of the meeting may include other EPA staff and contractors, and State staff and DOD staff, where the sediment OU is State-lead or federal facility-lead. The meeting will also include a site

visit, a half-day session where stakeholders may make presentations, and a half-day CSTAG-only session where the CSTAG begins drafting it recommendations. In addition to the CSTAG members and Regional/State staff, the appropriate OSRTI Regional coordinator will also be invited to attend. The RPM should submit a written summary (*i.e.*, a Consideration Memo) stating how he or she addressed each of the 11 principles and a site background information package to the co-chairs at least two weeks prior to the meeting. Selected sections of technical documents may be appended to add additional details if needed. Initial meetings will focus on only one site; while subsequent meetings will be held in a Regional office and may focus on a couple of sites already visited. Subsequent meetings will normally occur before the RI//FS report has been finalized, before the Proposed Plan has been sent out for public review, and before the first five-year review or site completion report have been completed. The CSTAG plans to monitor the progress at each site until all remedial action objectives have been met.

Stakeholder Participation

Although these CSTAG meetings are not public meetings, the Regional CSTAG member and EPA RPM will give key stakeholder groups that have had significant involvement with the site the opportunity to give a short oral presentation to the CSTAG at the *first* site meeting. This will normally include the lead State agency, lead PRP, lead trustee, tribe(s), and recognized community groups such as those with a TAG. To allow time for adequate presentations and questions from the CSTAG members, no more than four to six presentations should be scheduled.

The key stakeholders should be sent invitations at least six weeks before the meeting in order to allow time to prepare a presentation if they decide to make one. The presentation should focus on how they think EPA is or should be addressing the 11 principles at the site. If four to six stakeholders will make a presentation, each one should be no more than 20 minutes with an additional 10 minutes available for discussion with the CSTAG members. If the invited stakeholders elect not to make an oral presentation, they may submit a written one instead. Other parts of the meeting will be reserved for EPA, or EPA and the State or other federal Agency where the sediment OU is not EPA-Lead. Other stakeholders not invited to the meeting may submit written comments to the CSTAG on how the 11 Principles should be considered. All written submittals, including a summary of each oral presentation, should be sent to the EPA RPM at least one week prior to the meeting and should not exceed ten pages.

CSTAG Recommendations

After the initial meeting on a site, and after subsequent meetings as appropriate, the CSTAG will send to the RPM, within six weeks, a list of recommendations on how the RPM might better address the 11 principles in ongoing and planned work. The appropriate OSRTI Regional Branch Chief, Division Director, and Office Director and the Regional Branch Chief will be copied and a copy will be placed on the Contaminated Sediments in Superfund Web page at http://www.epa.gov/superfund/resources/sediment/. The RPM will provide the CSTAG co-chairs with a brief written response to all recommendations within two months of receiving

them. The RPM will also send a copy of the response, along with the CSTAG recommendations, to all stakeholders that attended the meeting. OSRTI will also place the regional response on the web page.

Coordination with the National Remedy Review Board

It is anticipated that the proposed remedy for most of the large sites being reviewed by the CSTAG will also meet the requirements for review by the NRRB. When an RPM prepares the site package for the NRRB, the RPM should also prepare and submit to the NRRB and the CSTAG co-chairs a draft Consideration Memo. The memo should document how all 11 principles were considered in selecting the proposed remedy for the site and should normally be less than 20 pages. The CSTAG co-chairs will distribute the memo to the CSTAG members for their review. In order to avoid sending two sets of recommendations to the RPM, any CSTAG comments will be relayed to the Chair of the NRRB. At least two members of the CSTAG will attend the NRRB meeting (this can include NRRB members that are also CSTAG members) to offer advice on site issues relative to the 11 principles.

The CSTAG may modify these operating procedures after more sites have been visited and more experience has been gained.

Current CSTAG Members

Region 1	Kymberlee Keckler	617-918-1385
Region 2	Doug Tomchuk	212-637-3956
Region 3	Randy Sturgeon	215-814-3227
Region 4	Craig Zeller	404-562-8827
Region 5	Stephanie Ball	312-353-2315
	Bonnie Eleder*	312-886-4885
Region 6	John Meyer, Co-Chair	214-665-6742
Region 7	Craig Smith	913-551-7683
Region 8	Judith McCulley	303-312-6667
Region 9	Fred Schauffler	415-972-3174
Region 10	Allison Hiltner	206-553-2140
ORD/NHEERL	Barbara Bergen	401-782-3059
ORD/NERL	Earl Hayter	706-355-8303
OSRTI	Steve Ells, Co-Chair	703-603-8822
OSRTI	Leah Evison	703-603-9022

* alternate member

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

FEB 12 2002

OFFICE OF
SOLID WASTE AND EMERGENCY
RESPONSE

OSWER Directive 9285.6-08

MEMORANDUM

SUBJECT: Principles for Managing Contaminated Sediment Risks at Hazardous Waste Sites

FROM: Marianne Lamont Horinko /s/
Assistant Administrator

TO: Superfund National Policy Managers, Regions 1 - 10
RCRA Senior Policy Advisors, Regions 1 - 10

I. PURPOSE

This guidance will help EPA site managers make scientifically sound and nationally consistent risk management decisions at contaminated sediment sites. It presents 11 risk management principles that Remedial Project Managers (RPMs), On-Scene Coordinators (OSCs), and RCRA Corrective Action project managers should carefully consider when planning and conducting site investigations, involving the affected parties, and selecting and implementing a response.

This guidance recommends that EPA site managers make risk-based site decisions using an iterative decision process, as appropriate, that evaluates the short-term and long-term risks of all potential cleanup alternatives consistent with the National Oil and Hazardous Substances Pollution Contingency Plan's (NCP's) nine remedy selection criteria (40 CFR Part 300.430). EPA site managers are also encouraged to consider the societal and cultural impacts of existing sediment contamination and of potential remedies through meaningful involvement of affected stakeholders.

This guidance also responds in part to the recommendations contained in the National Research Council (NRC) report discussed below.

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II. BACKGROUND

On March 26, 2001, the NRC published a report entitled *A Risk Management Strategy for PCB-Contaminated Sediments*. Although the NRC report focuses primarily on assessment and remediation of PCB-contaminated sediments, much of the information in that report is applicable to other contaminants. Site managers are encouraged to read the NRC report, which may be found at http://www.nrc.edu.

In addition to developing these principles, OSWER, in coordination with other EPA offices (Office of Research and Development, Office of Water, and others) and other federal agencies (Department of Defense/U.S. Army Corps of Engineers, Department of Commerce/National Oceanic and Atmospheric Administration, Department of the Interior/U.S. Fish and Wildlife Service, and others is developing a separate guidance, *Contaminated Sediment Remediation Guidance for Hazardous Waste Sites* (Sediment Guidance). The Sediment Guidance will provide more detailed technical guidance on the process that Superfund and RCRA project managers should use to evaluate cleanup alternatives at contaminated sediment sites.

While this directive applies to all contaminants at sediment sites addressed under CERCLA or RCRA, its implementation at particular sites should be tailored to the size and complexity of the site, to the magnitude of site risks, and to the type of action contemplated. These principles can be applied within the framework of EPA's existing statutory and regulatory requirements.

III. RISK MANAGEMENT PRINCIPLES

1. Control Sources Early.

As early in the process as possible, site managers should try to identify all direct and indirect continuing sources of significant contamination to the sediments under investigation. These sources might include discharges from industries or sewage treatment plants, spills, precipitation runoff, erosion of contaminated soil from stream banks or adjacent land, contaminated groundwater and non-aqueous phase liquid contributions, discharges from storm water and combined sewer outfalls, upstream contributions, and air deposition.

Next, site managers should assess which continuing sources can be controlled and by what mechanisms. It may be helpful to prioritize sources according to their relative contributions to site risks. In the identification and assessment process, site managers should solicit assistance from those with relevant information, including regional Water, Air, and PCB Programs (where applicable); state agencies (especially those responsible for setting Total Maximum Daily Loads (TMDLs) and those that issue National Pollutant Discharge Elimination System (NPDES) permits); and all Natural Resource Trustees. Local agencies and stakeholders may also be of assistance in assessing which sources can be controlled.

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Site managers should evaluate the potential for future recontamination of sediments when selecting a response action. If a site includes a source that could result in significant recontamination, source control measures will likely be necessary as part of that response action. However, where EPA believes that the source can be controlled, or where sediment remediation will have benefits to human health and/or the environment after considering the risks caused by the ongoing source, it may be appropriate for the Agency to select a response action for the sediments prior to completing all source control actions. This is consistent with principle #5 below, which indicates that it may be necessary to take phased or interim actions (e.g., removal of a hot spot that is highly susceptible to downstream movement or dispersion of contaminants) to prevent or address environmental impacts or to control human exposures, even if source control actions have not been undertaken or completed.

2. Involve the Community Early and Often.

Contaminated sediment sites often involve difficult technical and social issues. As such, it is especially important that a project manager ensure early and meaningful community involvement by providing community members with the technical information needed for their informed participation. Meaningful community involvement is a critical component of the site characterization, risk assessment, remedy evaluation, remedy selection, and remedy implementation processes. Community involvement enables EPA to obtain site information that may be important in identifying potential human and ecological exposures, as well as in understanding the societal and cultural impacts of the contamination and of the potential response options. The NRC report (p. 249) "recommends that increased efforts be made to provide the affected parties with the same information that is to be used by the decision-makers and to include, to the extent possible, all affected parties in the entire decision-making process at a contaminated site. In addition, such information should be made available in such a manner that allows adequate time for evaluation and comment on the information by all parties." Through Technical Assistance Grants and other mechanisms, project managers can provide the community with the tools and information necessary for meaningful participation, ensuring their early and continued involvement in the cleanup process.

Although the Agency has the responsibility to make the final cleanup decision at CERCLA and RCRA sites, early and frequent community involvement facilitates acceptance of Agency decisions, even at sites where there may be disagreement among members of the community on the most appropriate remedy.

Site managers and community involvement coordinators should take into consideration the following six practices, which were recently presented in OSWER Directive 9230.0-99 *Early and Meaningful Community Involvement* (October 12, 2001). This directive also includes a list of other useful resources and is available at http://www.epa.gov/superfund/pubs.htm.

(1) Energize the community involvement plan.
(2) Provide early, proactive community support.

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(3) Get the community more involved in the risk assessment.
(4) Seek early community input on the scope of the remedial investigation/feasibility study (RI/FS).
(5) Encourage community involvement in identification of future land use.
(6) Do more to involve communities during removals.

3. Coordinate with States, Local Governments, Tribes, and Natural Resource Trustees.

Site managers should communicate and coordinate early with states, local governments, tribes, and all Natural Resource Trustees. By doing so, they will help ensure that the most relevant information is considered in designing site studies, and that state, local, tribal, and trustee viewpoints are considered in the remedy selection process. For sites that include waterbodies where TMDLs are being or have been developed, it is especially important to coordinate site investigations and monitoring or modeling studies with the state and with EPA's water program. In addition, sharing information early with all interested parties often leads to quicker and more efficient protection of human health and the environment through a coordinated cleanup approach.

Superfund's statutory mandate is to ensure that response actions will be protective of human health and the environment. EPA recognizes, however, that in addition to EPA's response action(s), restoration activities by the Natural Resource Trustees may be needed. It is important that Superfund site managers and the Trustees coordinate both the EPA investigations of risk and the Trustee investigations of resource injuries in order to most efficiently use federal and state resources and to avoid duplicative efforts.

Additional information on coordinating with Trustees may be found in OSWER Directive 9200.4-22A *CERCLA Coordination with Natural Resource Trustees* (July 1997), in the 1992 ECO Update *The Role of Natural Resource Trustees in the Superfund Process* http://www.epa.gov/superfund/programs/risk/tooleco.htm), and in the 1999 OSWER Directive 9285.7-28P *Ecological Risk Assessment and Risk Management Principles for Superfund Sites* (also available at the above web site). Additional information on coordinating with states and tribes can be found in OSWER Directive 9375.3-03P *The Plan to Enhance the Role of States and Tribes in the Superfund Program* (http://www.epa.gov/superfund/states/strole/index.htm).

4. Develop and Refine a Conceptual Site Model that Considers Sediment Stability.

A conceptual site model should identify all known and suspected sources of contamination, the types of contaminants and affected media, existing and potential exposure pathways, and the known or potential human and ecological receptors that may be threatened. This information is frequently summarized in pictorial or graphical form, backed up by site-specific data. The conceptual site model should be prepared early and used to guide site investigations and decision-making. However, it should be updated periodically whenever new

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information becomes available, and EPA's understanding of the site problems increases. In addition, it frequently can serve as the centerpiece for communication among all stakeholders.

A conceptual site model is especially important at sediment sites because the interrelationship of soil, surface and groundwater, sediment, and ecological and human receptors is often complex. In addition, sediments may be subject to erosion or transport by natural or man-made disturbances such as floods or engineering changes in a waterway. Because sediments may experience temporal, physical, and chemical changes, it is especially important to understand what contaminants are currently available to humans and wildlife, and whether this is likely to change in the future under various scenarios. The risk assessor and project manager, as well as other members of the site team, should communicate early and often to ensure that they share a common understanding of the site and the basis for the present and future risks. The May 1998 EPA *Guidelines for Ecological Risk Assessment* (Federal Register 63(93) 26846-26924, http://www.epa.gov/superfund/programs/risk/tooleco.htm), the 1997 Superfund Guidance *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecologicql Risk Assessments* (EPA 540-R-97-006, also available at the above web site), and the 1989 *Risk Assessment Guidance for Superfund (RAGS), Volume 1, Part A* (EPA 540-1-89-002, http://www.epa.gov/superfund/programs/risk/ragsa) provide guidance on developing conceptual site models.

5. Use an Iterative Approach in a Risk-Based Framework.

The NRC report (p. 52) recommends the use of a risk-based framework based on the one developed by the Presidential/Congressional Commission on Risk Assessment and Risk Management (PCCRARM, 1997, *Framework for Environmental Health Risk Management,* Vol. 1, as cited by NRC 2001). However, as recognized by the NRC (p. 60): "The framework is intended to supplement, not supplant, the CERCLA remedial process mandated by law for Superfund sites."

Although there is no universally accepted, well-defined risk-based framework or strategy for remedy evaluation at sediment sites, there is wide-spread agreement that risk assessment should play a critical role in evaluating options for sediment remediation. The Superfund program uses a flexible, risk-based framework as part of the CERCLA and NCP process to adequately characterize ecological and human health site risks. The guidances used by the RCRA Corrective Action program (http://www.epa.gov/correctiveaction/resource/guidance) also recommend a flexible risk-based approach to selecting response actions appropriate for the site.

EPA encourages the use of an iterative approach, especially at complex contaminated sediment sites. As used here, an iterative approach is defined broadly to include approaches which incorporate testing of hypotheses and conclusions and foster re-evaluation of site assumptions as new information is gathered. For example, an iterative approach might include pilot testing to determine the effectiveness of various remedial technologies at a site. As noted in

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the NRC report (p. 66): "Each iteration might provide additional certainty and information to support further risk-management decisions, or it might require a course correction."

An iterative approach may also inoorporate the use of phased, early, or interim actions. At complex sediment sites, site managers should consider the benefits of phasing the remediation. At some sites, an early action may be needed to quickly reduce risks or to control the ongoing spread of contamination. In some cases, it may be appropriate to take an interim action to control a source, or remove or cap a hot spot, followed by a period of monitoring in order to evaluate the effectiveness of these interim actions before addressing less contaminated areas.

The NRC report makes an important point when it notes (p. 256): "The committee cautions that the use of the framework or other risk-management approach should not be used to delay a decision at a site if sufficient information is available to make an informed decision. Particularly in situations in which there are immediate risks to human health or the ecosystem, waiting until more information is gathered might result in more harm than making a preliminary decision in the absence of a complete set of information. The committee emphasizes that a 'wait-and-see' or 'do-nothing' approach might result in additional or different risks at a site."

6. Carefully Evaluate the Assumptions and Uncertainties Associated with Site Characterization Data and Site Models.

The uncertainties and limitations of site characterization data, and qualitative or quantitative models (e.g., hydrodynamic, sediment stability, contaminant fate and transport, or food-chain models) used to extrapolate site data to future conditions should be carefully evaluated and described. Due to the complex nature of many large sediment sites, a quantitative model is often used to help estimate and understand the current and future risks at the site and to predict the efficacy of various remedial alternatives. The amount of site-specific data required and the complexity of models used to support site decisions should depend on the complexity of the site and the significance of the decision (e.g., level of risk, response cost, community interest). All new models and the calibration of models at large or complex sites should be peerreviewed consistent with the Agency's peer review process as described in its Peer Review Handbook (EPA 100-B-00-001, http://www.epa.gov/ORD/spe/2peerrev.htm).

Site managers should clearly describe the basis for all models used and their uncertainties when using the predicted results to make a site decision. As recognized by the NRC report (p. 65), however, "Management decisions must be made, even when information is imperfect. There are uncertainties associated with every decision that need to be weighed, evaluated, and communicated to affected parties. Imperfect knowledge must not become an excuse for not making a decision."

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7. Select Site-specific, Project-specific, and Sediment-specific Risk Management Approaches that will Achieve Risk-based Goals.

EPA's policy has been and continues to be that there is no presumptive remedy for any contaminated sediment site, regardless of the contaminant or level of risk. This is consistent with the NRC report's statement (p. 243) that "There is no presumption of a preferred or default risk management option that is applicable to all PCB-contaminated-sediment sites." At Superfund sites, for example, the most appropriate remedy should be chosen after considering site-specific data and the NCP's nine remedy selection criteria. All remedies that may potentially meet the removal or remedial action objectives (e.g., dredging or excavation, in-situ capping, in-situ treatment, monitored natural recovery) should be evaluated prior to selecting the remedy. This evaluation should be conducted on a comparable basis, considering all components of the remedies, the temporal and spatial aspects of the sites, and the overall risk reduction potentially achieved under each option.

At many sites, a combination of options will be the most effective way to manage the risk. For example, at some sites, the most appropriate remedy may be to dredge high concentrations of persistent and bioaccumulative contaminants such as PCBs or DDT, to cap areas where dredging is not practicable or cost-effective, and then to allow natural recovery processes to achieve further recovery in net depositional areas that are less contaminated.

8. Ensure that Sediment Cleanup Levels are Clearly Tied to Risk Management Goals.

Sediment cleanup levels have often been used as surrogates for actual remediation goals (e.g., fish tissue concentrations or other measurable indicators of exposure relating to levels of acceptable risk). While it is generally more practical to use measures such as contaminant concentrations in sediment to identify areas to be rdmediated, other measures should be used to ensure that human health and/or ecological risk reduction goals are being met. Such measures may include direct measurements of indigenous fish tissue concentrations, estimates of wildlife reproduction, benthic macroinvertebrate indices, or other "effects endpoints" as identified in the baseline risk assessment.

As noted in the NRC report (p. 123), "The use of measured concentrations of PCBs in fish is suggested as the most relevant means of measuring exposures of receptors to PCBs in contaminated sediments." For other contaminants, other measures may be more appropriate. For many sites, achieving remediation goals, especially for bioaccumulative contaminants in biota, may take many years. Site monitoring data and new scientific information should be considered in future reviews of the site (e.g., the Superfund five-year review) to ensure that the remedy remains protective of human health and the environment.

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9. Maximize the Effectiveness of Institutional Controls and Recognize their Limitations.

Institutional controls, such as fish consumption advisories and waterway use restrictions, are often used as a component of remedial decisions at sediment sites to limit human exposures and to prevent further spreading of contamination until remedial action objectives are met. While these controls can be an important component of a sediment remedy, site managers should recognize that they may not be very effective in eliminating or significantly reducing all exposures. If fish consumption advisories are relied upon to limit human exposures, it is very important to have public education programs in place. For other types of institutional controls, other types of compliance assistance programs may also be needed (e.g., state/local government coordination). Site managers should also recognize that institutional controls seldom limit ecological exposures. If monitoring data or other site information indicates that institutional controls are not effective, additional actions may be necessary.

10. Design Remedies to Minimize Short-term Risks while Achieving Long-term Protection.

The NRC report notes (p. 53) that: "Any decision regarding the specific choice of a risk management strategy for a contaminated sediment site must be based on careful consideration of the advantages and disadvantages of available options and a balancing of the various risks, costs, and benefits associated with each option." Sediment cleanups should be designed to minimize short-term impacts to the extent practicable, even though some increases in short-term risk may be necessary in order to achieve a long-lasting solution that is protective. For example, the longterm benefits of removing or capping sediments containing persistent and bioaccumulative contaminants often outweigh the additional short-term impacts on the already-affected biota.

In addition to considering the impacts of each alternative on human health and ecological risks, the short-term and long-term impacts of each alternative on societal and cultural practices should be identified and considered, as appropriate. For example, these impacts might include effects on recreational uses of the waterbody, road traffic, noise and air pollution, commercial fishing, or disruption of way of life for tribes. At some sites, a comparative analysis of impacts such as these may be useful in order to fully assess and balance the tradeoffs associated with each alternative.

11. Monitor During and After Sediment Remediation to Assess and Document Remedy Effectiveness.

A physical, chemical, and/or biological monitoring program should be established for sediment sites in order to determine if short-term and long-term health and ecological risks are being adequately mitigated at the site and to evaluate how well all remedial action objectives are being met. Monitoring should normally be conducted during remedy implementation and as long as necessary thereafter to ensure that all sediment risks have been adequately managed. Baseline

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data needed for interpretation of the monitoring data should be collected during the remedial investigation.

Depending on the risk management approach selected, monitoring should be conducted during implementation in order to determine whether the action meets design requirements and sediment cleanup levels, and to assess the nature and extent of any short-term impacts of remedy implementation. This information can also be used to modify construction activities to assure that remediation is proceeding in a safe and effective manner. Long-term monitoring of indicators such as contaminant concentration reductions in fish tissue should be designed to determine the success of a remedy in meeting broader remedial action objectives. Monitoring is generally needed to verify the continued long-term effectiveness of any remedy in protecting human health and the environment and, at some sites, to verify the continuing performance and structural integrity of barriers to contaminant transport.

IV. IMPLEMENTATION

EPA RPMs, OSCs, and RCRA Corrective Action project managers should immediately begin to use this guidance at all sites where the risks from contaminated sediment are being investigated. EPA expects that Federal facility responses conducted under CERCLA or RCRA will also be consistent with this directive. This consultation process does not apply to Time-Critical or emergency removal actions or to sites with only sediment-like materials in wastewater lagoons, tanks, storage or containment facilities, or drainage ditches.

Consultation Process for CERCLA Sites

To help ensure that Regional site managers appropriately consider these principles before site-specific risk management decisions are made, this directive establishes a two-tiered consultation procedure that will apply to most contaminated sediment sites. The consultation process applies to all proposed or listed NPL sites where EPA will sign or concur on the ROD, all Non-Time-Critical removal actions where EPA will sign or concur on the Action Memorandum, and all "NPL-equivalent" sites where there is or will be an EPA-enforceable agreement in place.

Tier 1 Process

Where the sediment action(s) for the entire site will address more than 10,000 cubic yards or five acres of contaminated sediment, Superfund RPMs and OSCs should consult with their appropriate Office of Emergency and Remedial Response (OERR) Regional Coordinator at least 30 days before issuing for public comment a Proposed Plan for a remedial action or an Engineering Evaluation/Cost Analysis (EE/CA) for a Non-Time-Critical removal action.

This consultation entails the submission of the draft proposed plan or draft EE/CA, a written discussion of how the above 11 principles were considered, and basic site information

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that will assist OERR in tracking significant sediment sites. If the project manager has not received a response from OERR within two weeks, he or she may assume no further information is needed at this time. EPA believes that this process will help promote nationally consistent approaches to evaluate, select and implement protective, scientifically sound, and cost-effective remedies.

Tier 2 Process

This directive also establishes a new technical advisory group (Contaminated Sediments Technical Advisory Group-CSTAG) that will monitor the progress of and provide advice regarding a small number of large, complex, or controversial contaminated sediment Superfund sites. The group will be comprised of ten Regional staff and approximately five staff from OSWER, OW, and ORD. For most sites, the group will meet with the site manager and the site team several times throughout the site investigation, response selection, and action implementation processes. For new NPL sites, the group will normally meet within one year after proposed listing. It is anticipated that for most sites, the group will meet annually until the ROD is signed and thereafter as needed until all remedial action objectives have been met. The specific areas of assistance or specific documents to be reviewed will be decided by the group on a case-by-case basis in consultation with the site team. For selected sites with an on-going RI/FS or EE/CA, the group will be briefed by the site manager some time in 2002 or 2003. Reviews at sites with remedies also subject to National Remedy Review Board (NRRB) review will be coordinated with the NRRB in order to eliminate the need for a separate sediment group review at this stage in the process.

Consultation Process for RCRA Corrective Action Facilities

Generally, for EPA-lead RCRA Corrective Action facilities where a sediment response action is planned, a two-tiered consultation process will also be used. Where the sediment action(s) for the entire site will address more than 10,000 cubic yards or five acres of contaminated sediment, project managers should consult with the Office of Solid Waste's Corrective Action Branch at least 30 days before issuing a proposed action for public comment. This consultation entails the submission of a written discussion of how the above 11 principles were considered, and basic site information that will assist OSW in tracking significant sediment sites.

If the project manager has not received a response from OSW within two weeks, he or she may assume no further information is needed. States are also encouraged to follow these procedures. For particularly large, complex, or controversial sites, OSW will likely call on the technical advisory group discussed above.

EPA also recommends that both state and EPA project managers working on sediment contamination associated with Corrective Action facilities consult with their colleagues in both RCRA and Superfund to promote consistent and effective cleanups. EPA believes this

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consultation would be particularly important for the larger-scale sediment cleanups mentioned above.

EPA may update this guidance as more information becomes available on topics such as: the effectiveness of various sediment response alternatives, new methods to evaluate risks, or new methods for characterizing sediment contamination. For additional information on this guidance, please contact the OERR Sediments Team Leader (Stephen Ells at 703 603-8822) or the OSW Corrective Action Programs Branch Chief (Tricia Buzzell at 703 308-8632).

NOTICE: This document provides guidance to EPA Regions concerning how the Agency intends to exercise its discretion in implementing one aspect of the CERCLA and RCRA remedy selection process. This guidance is designed to implement national policy on these issues. Some of the statutory provisions described in this document contain legally binding requirements. However, this document does not substitute for those provisions or regulations, nor is it a regulation itself. Thus it cannot impose legally binding requirements on EPA, states, or the regulated community, and may not apply to a particular situation based upon the circumstances. Any decisions regarding a particular situation will be made based on the statutes and regulations, and EPA decision-makers retain the discretion to adopt approaches on a case-by-case basis that differ from this guidance where appropriate. Interested parties are free to raise questions and objections about the substance of this guidance and the appropriateness of the application of this guidance to a particular situation, and the Agency welcomes public input on this document at any time. EPA may change this guidance in the future.

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EPA Sediment Policy

Principles for Managing Contaminated Sediment Risks at Hazardous Waste Sites

OSWER Directive 9285.6-08

Risk Management Principle #1

Control Sources Early

Risk Management Principle #2

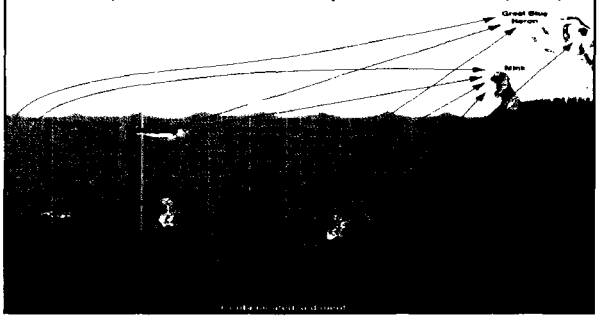
Involve the Community Early and Often

Risk Management Principle #3

Coordinate With States, Local Governments, Tribes, and Natural Resource Trustees

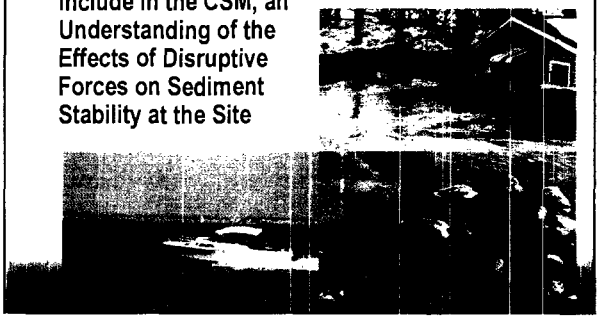
Risk Management Principle #4

Develop and Refine a Conceptual Site Model (CSM)



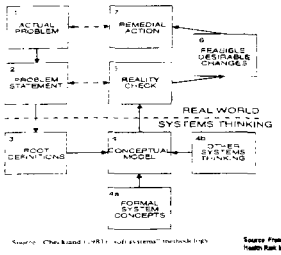
Principle #4 (Continued)

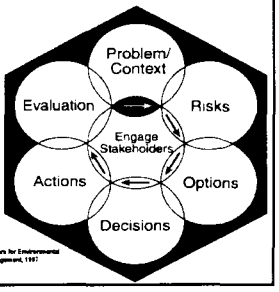
Include in the CSM, an Understanding of the Effects of Disruptive Forces on Sediment Stability at the Site



Risk Management Principle #5

Use an Iterative Approach in a Risk-Based Framework

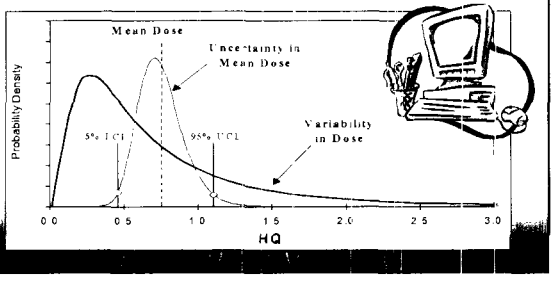




Source: Framework for Environmental Health Risk Management, 1997

Risk Management Principle #6

Evaluate Assumptions and Uncertainties Associated With Site Characterization and Models



Risk Management Principle #7

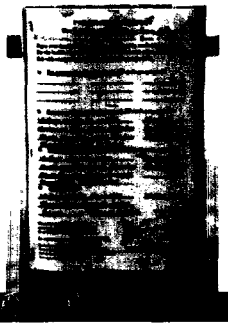
Select Site-, Project- and Sediment-Specific Risk Management That Achieves Risk-Based Goals

Risk Management Principle #8

Ensure That Cleanup Levels are Clearly Tied to Risk Management Goals

Risk Management Principle #9

Maximize the Effectiveness of Institutional Controls and Recognize Their Limitations



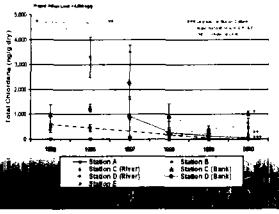
Risk Management Principle #10

Design Remedies to Achieve Long-Term Protection and to Minimize Short-Term Risks

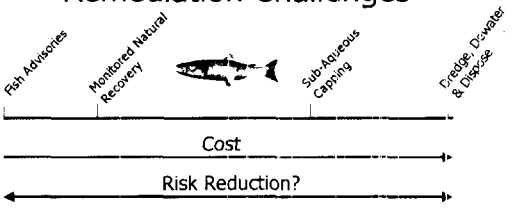
- Dredging and capping may kill biota, disrupt habitats, and lead to short-term increases in contaminant concentrations.
- The long-term benefits achieved by the removal of mobile PBTs from a dynamic environment may outweigh the short-term negative effects

Risk Management Principle #11

Monitor During and After Sediment Remediation to Assess and Document Remedy Effectiveness



Remediation Challenges



ISSUES:

- Can remediation goals be met? Will remediation be too disruptive?
- How effective is dredging? Where are dredge materials disposed to?
- How effective is isolation capping? Will capping impede navigation?
- How effective are institutional controls such as fish advisories?
- How long will natural recovery take before risks become acceptable?
- *What are short and long-term risks of each remediation option?*