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

OFFICE OF
SOLID WASTE AND EMERGENCY
RESPONSE

JUL 3 2008

OSWER Directive 9200.1-90

MEMORANDUM

SUBJECT: Response to Regional Request Regarding Sediment Cleanup at May 2008 Superfund Division Directors Meeting

FROM: James E. Woolford, Director
Office of Superfund Remediation & Technology Innovation

TO: Superfund National Policy Managers, Regions 1-10

The purpose of this memorandum is to respond to the Superfund Regional Division Directors' request for clarification at our recent biannual meeting about OSRTI's position on dredging as a remedial option for contaminated sediment sites. In short, OSRTI believes that dredging, while not a presumptive remedy, should be considered on an equal footing with other remedial options. The most appropriate remedy for a site, which may include dredging for all or part of the site, should be chosen after considering site-specific data and the National Oil and Hazardous Substances Pollution Contingency Plan's (NCP's) nine remedy selection criteria.

First, attached please find the two Agency responses that were sent to the National Academy of Sciences (NAS) regarding their reports on sediments. The first report: *A Risk Management Strategy for PCB-Contaminated Sediments* was issued in 2001. This report addressed a number of issues dealing with sediment remediation. The NAS stressed the importance of "the management of overall risk to human health and the environment rather than the selection of a remediation technology (e.g., dredging, capping or natural attenuation)." It also stated: "There should be no presumption of a preferred or default risk-management option that is applicable to all PCB contaminated sediment sites."

The second NAS report: *Sediment Dredging at Superfund Megasites - Assessing the Effectiveness*, was issued in 2007. This report focused on dredging and did not consider the potential effectiveness of capping or monitored natural recovery (MNR). This report recommended that: "remedies should be designed to meet long-term risk reduction goals (as

opposed to metrics not strictly related to risk, such as mass-removal targets)," and that "Environmental conditions that limit or favor the effectiveness of dredging should be given major considerations in deciding whether to dredge at a site."

In response to the first NAS report, OSRTI (then OERR) issued the *Principles for Managing Contaminated Sediment Risks at Hazardous Waste Sites* (attached) in February of 2002 which we continue to use. Regarding the questions that came up with respect to remedy selection, I point you to Principle # 7 which states: "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." The principles encourage the use of combination remedies as "the most effective way to manage risk." It goes on to state that "For example, at some sites, the most appropriate remedy may be to dredge high concentrations of persistent and bioaccumulative contaminants like PCBs and DDT, to cap areas where dredging is not practicable or cost-effective, then to allow natural recovery processes to achieve further recovery in net depositional areas that are less contaminated." In addition, the Agency issued a *Contaminated Sediments Action Plan* (attached) in 2002. After the 2007 NAS report was issued, OSRTI sent another formal response (attached) to the NAS on January 11, 2008.

Secondly, I would also like to remind the Regions of the consultation process regarding contaminated sediments. As stated in our updated 2004 Guidelines memo:

> Under the Tier 1 review process, Directive 9285.6-08 requested that RPMs (or OSCs) submit written documentation (i.e., a Consideration Memo) to the headquarters' Superfund program office (then known as OERR, now as OSRTI) prior to proposing a response that includes a sediment action which, in combination with other sediment actions at a site, would result in dredging more than 10,000 cy or capping or using monitored natural recovery as a remedy for more than five acres, calculated on a site-wide basis. The Consideration Memo should be sent to the appropriate OSRTI coordinator at least 30 days before issuing the Proposed Plan or EE/CA. It is anticipated that a typical Tier 1 Consideration Memo will be no longer than 10 pages, but will vary with the complexity of the site.

More details can be found at
http://www.epa.gov/superfund/health/conmedia/sediment/pdfs/guideline.pdf.

Under the Tier 2 review process, Directive 9285.6-08 established the Contaminated Sediments Technical Advisory Group (CSTAG) to monitor the progress of and provide advice regarding a small number of large, complex, or controversial contaminated sediment Superfund sites. For most sites, the group will meet with the site managers and the site team several times throughout the site investigation, response selection, and action implementation process. After each meeting, CSTAG recommendations will be sent to the remedial project manager (RPM) on how the RPM might better address the sediment principles in ongoing and planned work. A copy of the CSTAG comments and the Regional response to those comments will be placed on the OSRTI's sediment web page.

Finally, much more detail can be found regarding remediation of contaminated sediments in our December 2005 guidance. That guidance encourages project managers to consider a number of factors during cleanup of contaminated sediment, such as:

- Identifying and controlling the sources of sediment contamination and identifying the pathways of contaminant exposure, prior to cleanup;
- Using a technical team approach and involving the community and other stakeholders throughout the cleanup process;
- Considering all three major approaches to management of contaminated sediment (monitored natural recovery, in-situ capping, and dredging) and considering alternatives which combine approaches;
- Validating models used to support sediment decisions and considering model uncertainty and sensitivity;
- Considering how contaminated sediment alternatives manage or reduce risks, including consideration of residual risks; and
- Monitoring the effectiveness of remedies at contaminated sediment sites.

The detailed guidance can be found at http://www.epa.gov/superfund/health/conmedia/sediment/guidance.htm. I also recommend that you and your staff familiarize yourself with the OSRTI web site on sediments. One can find the documents listed above and a lot more information on sediments at: http://www.epa.gov/superfund/health/conmedia/sediment/.

Please feel free to contact me if you have further questions, or your staff may contact Steve Ells at 703-603-8822.

Attachments

cc: Regional Remedial Branch Chiefs
OSRTI Managers
Mary-Kay Lynch, OGC
Marcia Mulkey, OSRE
Debbie Dietrich, OEM
John Reeder, FFRRO
Steve Ells

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/ Marianne Lamont Horinko***
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.

2. 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.

3. 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.

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.

(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 9285.7-28 P *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

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 Ecological 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

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 incorporate 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 peer-reviewed 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/spc/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."

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 remediated, 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.

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 long-term 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

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

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

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.

cc: Michael H. Shapiro
Stephen D. Luftig
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Jeff Josephson, Superfund Lead Region Coordinator, USEPA Region 2
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Contaminated Sediments Action Plan

U.S. Environmental Protection Agency
June 2002

Contaminated Sediments Action Plan

INTRODUCTION

Management of contaminated sediments presents a multifaceted challenge to the U.S. Environmental Protection Agency (EPA). EPA's 1997 *National Sediment Quality Survey* reported more than 2,500 state fish consumption advisories in water bodies throughout the U.S. Many of these advisories are caused by contaminants found in sediments. The *National Sediment Quality Survey* identified ninety-six watersheds as "areas of probable concern". In addition, as many as 20% of the nation's Superfund sites may include contaminated sediments. EPA programs with authority to address sediment contamination operate under many statutes, including the Comprehensive Environmental Response, Compensation, and Liability Act, as amended (CERCLA), the Resource Conservation and Recovery Act (RCRA), the Clean Water Act (CWA) as amended by the Oil Pollution Act (OPA), and the Toxic Substances Control Act (TSCA).

In 1998, EPA prepared the *Contaminated Sediment Management Strategy* to streamline decision-making among these many programs and to help coordinate efforts to prevent sediment contamination from operating facilities using a range of voluntary, regulatory, and compliance/enforcement tools such as NPDES and RCRA permits, FIFRA and TSCA registration, and water quality standards (TMDLs). Prevention continues to be the most cost effective approach to addressing the contaminated sediment problem nationally.

The full spectrum of EPA's contaminated sediments activities, from remediation of contaminated sediment sites to the prevention of sediment contamination, benefits from coordination into a cohesive strategy and action plan. In addition, EPA has carefully reviewed conclusions and recommendations in the National Academy of Sciences' (NAS) 2001 report *A Risk-Management Strategy for PCB-Contaminated Sediments.*

The purpose of this Contaminated Sediments Action Plan is to report on our current activities and accomplishments, and to serve as a tool for EPA senior managers to closely coordinate our cross-program activities in the future.

ELEMENTS OF THE CONTAMINATED SEDIMENTS ACTION PLAN

1. Continue Obtaining Stakeholder Input

EPA will continue to solicit input from stakeholders on science and policy issues affecting management of contaminated sediments. In May 2001, EPA sponsored a contaminated sediments stakeholder forum. (The presentations made at this meeting are available on the Superfund Web page, www.epa.gov/superfund/new/sedpresent.htm.) In January 2002, EPA cosponsored a technical workshop on sediment stability. (The presentations at this meeting are available on the web page of the South/Southwest Hazardous Substance Research Center, www.hsrc.org/hsrc/html/ssw/sedstab/sedstab.html.) EPA plans to hold additional stakeholder meetings in FY2002 to discuss Agency efforts on contaminated sediments and to address key technical issues. Contact: Steve Ells, Office of Emergency and Remedial Response (OERR).

- In FY02-03, EPA's Office of Emergency and Remedial Response (OERR) will cosponsor at least two additional technical conferences with interested stakeholders. The first one will address characterizing ecological risks from sediment contamination and from remedy implementation (spring, 2002) and the second will address the fate and transport of contaminants in sediment (winter, 2003).

2. Improve Community Involvement

EPA will continue its efforts to improve community involvement during the investigation and cleanup of contaminated sites. Contact: Suzanne Wells, OERR.

- EPA issued additional guidance in November 2001 for site teams to promote early and meaningful community involvement in the Superfund site decision-making process.

- EPA will sponsor a workshop in the fall of 2002 in order to identify methods to improve consideration of societal and cultural impacts of baseline contamination and remedial alternatives at contaminated sites.

- EPA will continue to ensure independent technical assistance through the Technical Assistance Grant (TAG) and the Technical Outreach Services for Communities programs. These programs are available to interested community groups to help them understand the risks and potential remedies being considered at contaminated sites. We will also explore ways our technical assistance programs can better address the diverse needs of communities at large area sites.

3. Implement Risk Management Principles

EPA released a set of 11 fundamental risk management principles for use at contaminated sediment sites on February 12, 2002. The OSWER directive *Principles for Managing Contaminated Sediment Risks at Hazardous Waste Sites* outlines a consistent risk-based approach to be used in addressing contaminated sediment sites that can be applied within the framework of EPA's existing statutory and regulatory requirements. The directive has been posted on the internet site, www.epa.gov/superfund/resources/principles/9285.6-08.pdf .The risk management principles reflect recommendations in the 2001 NAS report. Contact: Steve Ells, OERR.

4. Develop Contaminated Sediment Remediation Guidance

The Office of Solid Waste and Emergency Response (OSWER) is developing a Contaminated Sediment Remediation Guidance, in cooperation with other EPA offices and other Federal agencies, in order to help site managers to evaluate contaminated sediment remedies and to promote sound site-specific decisions. The guidance includes consideration of the short-term impacts of remedial options as well as their ability to provide long-term protectiveness. The draft guidance is scheduled for public review in summer 2002. A final guidance is scheduled for winter of 2002. Contact: Leah Evison, OERR.

5. Implement New Consultation Procedures

As part of the Risk Management Principles initiative described above, OSWER will institute a new EPA Headquarters consultation procedure for all CERCLA and federal-lead RCRA sites where a significant sediment cleanup is expected. This consultation procedure will help improve national consistency in cleanup approaches and will ensure that the risk management principles are appropriately considered at contaminated sediment sites. Contact: Steve Ells, OERR.

6. Complete National Sediment Quality Survey and Report to Congress

In accordance with section 503 of the Water Resources Development Act of 1992 (WRDA), EPA's Office of Water (OW), in consultation with NOAA and the Secretary of the Army, is conducting a comprehensive national survey of data regarding sediment quality in the U.S.

- OW has drafted the first update to the 1997 "Incidence and Severity of Sediment Contamination in Surface Waters in the United States", *National Sediment Quality Survey*, which presents the results of a screening-level assessment of the National Sediment Inventory data from 1990 to 1999. The *National Sediment Quality Survey* used data from states and other sources that have been compiled in the National Sediment Inventory Database. For this assessment, OW examined sediment chemistry data, tissue residue data, and sediment toxicity test results. The purpose of this assessment is to determine whether potential adverse effects from sediment contamination either exist currently or existed over the past 10 years at distinct monitoring locations throughout the

United States. An updated draft report on the incidence and severity of sediment contamination in the U.S. was released for public comment in late 2001 and is expected to be published as final in early summer 2002. Contact: Scott Ireland, OW. See www.epa.gov/waterscience/cs/surveyfs.html.

7. Develop Additional Monitoring Guidance

EPA is developing guidance to assist regional site managers in collecting additional post-remediation monitoring data to better evaluate the effectiveness of implemented remedies.

- EPA's Office of Research and Development (ORD) is planning to hold a workgroup meeting or workshop in 2002 to address issues related to monitoring the remediation of contaminated sediments. The results of this work will be used to develop a series of new fact sheets on physical, chemical, and biological monitoring methods. Contacts: Randy Wentsel, ORD; Joan Fisk, OERR.

- OERR is collecting existing monitoring data in order to evaluate the effectiveness of various remedies in achieving remedial action objectives and cleanup goals. OERR is also identifying and funding new monitoring projects to obtain additional data. Contact: Leah Evison, OERR.

- OW has recently published a new technical manual that provides a compilation of methods for collecting sediment samples for chemical and toxicological analyses. This technical manual was published January 30, 2002. Contact: Richard Healy, OW. See www.epa.gov/water/waterscience/cs/collection.html.

8. Contaminated Sediment Assessment Pilot

In spring, 2002, OSWER, OW, the Office of Enforcement and Compliance Assurance (OECA), and EPA's Regional Offices will initiate a pilot project to facilitate cross-program coordination on contaminated sediments. The pilot project will bring a cross-Agency focus to identifying and assessing waters that are impaired by sediment contamination. The pilot will utilize the legal authorities and techniques available to satisfy the needs of both remedial investigation/feasibility study (RI/FS) evaluations and Total Maximum Daily Load (TMDL) modeling. The ultimate goal of the pilots is to develop more watershed-based approaches to identifying, assessing, and addressing, as necessary, contaminated sediments. EPA will work with other Federal agencies, states and interested stakeholders as these pilots are identified and implemented. Contacts: Donald Brady/Myra Price, OW; Lee Hofmann, OSWER; Sharon Frey, OERR.

9. Contaminated Sediments Management Committee

EPA has formed a Contaminated Sediments Management Committee with senior officials of various Headquarters and Regional Offices to ensure full coordination of technical and policy issues across EPA. Contact: Larry Reed, OERR.

In addition to the Contaminated Sediments Management Committee, EPA will reestablish the Sediment Network under the leadership of Office of Water's Office of Science and Technology, Superfund, and ORD, to resolve issues and share technical information on contaminated sediments across EPA's programs and regions. Contacts: Richard Healy, OW; Patricia Erickson, ORD.

10. Contaminated Sediments Science Plan

EPA is developing a Contaminated Sediments Science Plan to coordinate Agency-wide science activities and research with respect to contaminated sediments. The Science Plan analyzes the current Agency activities on contaminated sediments and lays out a strategy for future science activities and research. The research recommendations in the 2001 NAS report will be factored into the Science Plan. The Contaminated Sediment Science Plan will be available for public comment and for Science Advisory Board review in the summer 2002. Contact: Lee Hofmann, OSWER.

Concurrent with the development of the Contaminated Sediments Science Plan, ORD has developed, along with EPA offices and Regions, a draft multi-year research plan for contaminated site assessment, characterization, and cleanup, including contaminated sediment sites. The multi-year plan addresses contaminated sediment research needs in areas of modeling, monitoring, human health and ecological risk, and risk management. Six focus groups, made up of Headquarters and Regional scientists, have been formed to collaborate on addressing the key scientific issues concerning contaminated sediments. The results of ORD contaminated sediment research activities will be improved tools for use by EPA, states, local regulators and other stakeholders. Contacts: Ben Blaney, ORD; Sharon Frey, OERR.

NEXT STEPS

Implementation of this Action Plan is expected to continue over the course of FY 2002 and FY2003, with additional items potentially arising from the planned workshops, research projects, and coordination activities. It is expected that continuing discussions will be held both within and outside the Agency to ensure that EPA's contaminated sediments efforts will continue to identify and address areas of concern raised by stakeholders.

Action	Date
Multi-year plan issued to address contaminated sediment research needs.	November 2001
EPA issued additional guidance for site teams to promote early and meaningful community involvement in the Superfund site decision-making process.	November 2001
EPA released draft National Sediment Quality Survey and Report to Congress on the incidence and severity of sediment contamination in the U.S. for public comment.	December 2001
Researchers/multi-agency technical workshop on characterizing sediment stability and transport held.	January 22-24, 2002
OW published new technical manual for collecting sediments for chemical and toxicological analyses	January 30, 2002
EPA issued risk management principles for use at contaminated sediment sites.	February 12, 2002
EPA will convene a new NACEPT subcommittee to clarify the role of the NPL and analyze approach for cleaning up contaminated sediment and mining sites.	FY2002
ORD workshop planned to address issues related to monitoring the remediation of contaminated sediments.	FY2002
OERR technical workshop on characterizing ecological risks from sediment contamination and from remedy implementation planned.	Spring 2002
Contaminated Sediments Science Plan available for peer review.	Summer 2002
Draft Contaminated Sediment Remediation Guidance available for public review.	Summer 2002
Two public meetings planned to solicit public discussion and comments on the draft Sediment Remediation Guidance.	Summer 2002

EPA workshop planned to identify methods to improve consideration of societal and cultural impacts of baseline contamination and remedial alternatives at contaminated sites.	Fall 2002
Contaminated Sediment Assessment Pilot.	Fall 2002
Final Contaminated Sediment Remediation Guidance to be issued.	Winter 2002

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

OFFICE OF
SOLID WASTE AND EMERGENCY
RESPONSE

JAN 11 2008

Dr. James J. Reisa, Director
Board of Environmental Studies and Toxicology
National Research Council
500 Fifth St. NW
Washington, D.C. 20001

Dear Dr. Reisa:

I want to thank you, your staff, and the NRC Committee for the recently completed report: *Sediment Dredging at Superfund Megasites: Assessing the Effectiveness.*

The Committee's reinforcement of many of the recommendations in U.S.EPA's 2002 policy memorandum on sediments and in the 2005 sediment remediation guidance is encouraging. In addition, the Committee's thorough review and analysis of the available data yielded additional recommendations that will be considered by the Superfund program as we continue to evaluate remedial responses for contaminated sediment sites. As was acknowledged by the Committee, my Office has already taken steps to address some of the recommendations, and we plan to take additional actions to make further progress.

Although my staff and regional staff are still evaluating all of the recommendations in the report, we are planning the following actions to address the Committee's recommendations:

1 – Update the 2002 policy memorandum: "Principles for Managing Contaminated Sediment Risks at Hazardous Waste Sites" in order to: 1) incorporate information provided in the 2005 Contaminated Sediment Remediation Guidance for Hazardous Waste Sites; 2) address some of the findings in the National Research Council report; 3) reflect scientific advancements in site characterization; and 4) consider lessons learned from recent investigations at Superfund sediment sites.

2- Update the policy memorandum: "Guidelines for the OSRTI Review of Consideration Memos on Tier 1 Sediment Sites". This memorandum will be revised to further encourage RPMs to: 1) evaluate combination remedies for all large sediment sites where the site conditions in different

parts of the site are conducive to dredging, capping, and monitored natural recovery (MNR); 2) refine the Conceptual Site Model (CSM) before and during remedy implementation; 3) use an adaptive management approach to implement remedies; and 4) require the monitoring needed to evaluate the effectiveness of remedies in reducing risk.

3 - Provide supplemental guidance to the existing five-year review guidance on how to evaluate the protectiveness of sediment remedies.

4 - Add new sediment remedy data fields to the CERCLIS database in order to facilitate future evaluations of the effectiveness of sediment remedies during the five-year review process.

5 - Continue to coordinate with U.S. EPA's Office of Research and Development and other researchers performing field studies on dredging releases and residuals in order to develop simple models or methods for predicting dredging effectiveness on a site-specific basis.

6 - Develop technical fact sheets recommending sediment monitoring methods.

If you have any questions, please contact Steve Ells of my staff at 703 603-8822.

Sincerely,

James E. Woolford, Director
Office of Superfund Remediation and Technology Innovation