



Project Summary

Workshop on Innovative Technologies for Treatment of Contaminated Sediments June 13-14, 1990 Summary Report

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The U.S. Environmental Protection Agency's (EPA's) Risk Reduction Engineering Laboratory (RREL) developed and organized this workshop at the request of the EPA Office of Water Regulations and Standards (OWRS). Its two-fold purpose was 1) to provide interested individuals and organizations with current information on innovative treatment technologies for contaminated sediments, and 2) to provide RREL staff with an opportunity to increase their understanding of the problems associated with the management of contaminated sediments treatment at various locations throughout the United States.

The workshop was organized into six sessions related to policy and technology development. "Setting the Scene" included presentations by representatives from RREL, OWRS, EPA's Great Lakes National Program Office (GLNPO), Environment Canada, and the U.S. Army Corps of Engineers (COE). The succeeding four sessions were entitled "Dredged Materials Removal, Pretreatment, and Disposal," "Extraction Technologies," "Biological/Chemical Treatment Technologies," and "Other Technologies of Interest." The final session, an open discussion, provided an opportunity for attendees to raise questions, to provide input, and to exchange ideas.

This Project Summary was developed by EPA's Risk Reduction Engineering Laboratory, Cincinnati, OH, to announce key points of interest in the workshop, which is fully documented in a separate workshop summary report of the same

title (see Project Report ordering information at back).

Introduction

The scope of the contaminated sediments problem encompasses ecological damage, potential human health risks, and high cleanup costs. A total of 362 toxic chemicals have been identified in the bottom sediment of the Great Lakes. Fish and birds exhibit tangible effects of this pollution in disease, tumors, and deformities, but adequate health and ecological risks have not been quantified. It is estimated that remediation of Great Lakes sediments could cost \$10 billion. It would entail treatment of 40 million cubic yards of material at costs ranging from \$10 to \$1500 per cubic yard.

The Workshop on Innovative Technologies for Treatment of Contaminated Sediments was held in Cincinnati, OH, on June 13-14, 1990. The intent of this workshop was to provide interested individuals and organizations with current information on innovative treatment technologies and to give the RREL staff an opportunity to increase their understanding of the problems associated with the management of contaminated sediments treatment at various locations throughout the United States.

Scope of the Workshop

Individual presentations were made by representatives of the major contributing organizations, i.e., RREL, OWRS, GLNPO, Environment Canada, and the U.S. Army Corps of Engineers. Panel discussions were scheduled at regular intervals throughout the workshop to encourage a free exchange



of ideas and to maximize the opportunities to obtain additional useful information (see Photographs 1 and 2). An open discussion was held during the last workshop session so that attendees and workshop organizers could share their thoughts on approaches for treating contaminated sediments. Table 1 lists the subjects and technologies covered in the workshop presentations.

Workshop Highlights

"Setting the Scene" panelists addressed concerns about a lack of sufficient information, data, and goals for remediation technologies. They noted the wide diversity of site-specific conditions and the need to focus on treatment options for bioaccumulative compounds.

"Dredged Materials Removal, Pretreatment, and Disposal" panelists noted that operator experience is directly related to successful dredging and acknowledged the difficulty of controlling contaminant volatilization. They discussed permitting and monitoring of confined disposal facilities (CDFs).

"Extraction Technologies" panelists answered specific questions about the technologies they presented. These included the Low Energy Extraction Process (LEEP), a countercurrent process developed specifically for treating sediments; the Basic Extraction Sludge Treatment (BEST) process, for which treatability studies are needed to determine the level of fines that can be handled; and the CF Systems Solvent Extraction Process. They discussed the inadequacy of analytical methods for evaluating new technologies, and concluded that whereas existing analytical methods may be sufficient for regulatory purposes, they are insufficient for research and development.

"Biological/Chemical Treatment Technologies" panelists acknowledged that microorganisms acclimate less easily in the field than in the laboratory. In the field, surfactants are being used to increase contact between microbes, which are found in the aqueous soil fraction, and the contaminants found in the organic soil fraction. Panelists agreed that a bioslurry reactor

was an excellent option for treating sediment slurries with high oil concentrations and a maximum of 15 to 20 percent solids, but that soil tillage would be more useful for sediments with higher solids concentrations.

Members of the "Other Technologies of Interest" panel answered questions about the technologies they presented. Low-temperature thermal treatment technology is expected to compete with incineration because of its anticipated low cost and absence of byproduct formation (e.g., dioxins and furans). The absence of long-term monitoring data for solidification/stabilization is a source of uncertainty in consideration of its use for treatment of various organic compounds. Investigators continue to work on solving a corrosion problem associated with wet air oxidation. An ultraviolet radiation/ozonation technology, which may be of particular interest for treating contaminated sediments, will be demonstrated in fall 1990.

Questions submitted for the open discussion covered future plans to conduct treatability studies, the treatment and management of residuals, the development of



Photo 1. Panel Discussion I — "Setting the Scene."

Table 1. Technologies Covered in Workshop Presentations

<i>Workshop Session</i>	<i>Title of Presentation</i>
<i>Setting the Scene</i>	<i>Welcome and Challenge to Participants</i>
	<i>Overview of EPA Efforts on Contaminated Sediments</i>
	<i>The GLNPO Program and Contaminated Sediments Management</i>
	<i>The Canadian Experience with Contaminated Sediments</i>
	<i>ARCS Engineering/Technology Work Group Status</i>
	<i>SITE Program Overview</i>
	<i>Panel Discussion and Question and Answer Session</i>
<i>Dredged Materials Removal, Pretreatment, and Disposal</i>	<i>Dredging and Pretreatment Operations for Contaminated Sediments</i>
	<i>Material Handling Research at RREL</i>
	<i>Disposal of Dredged Material: Current Practices</i>
	<i>Research on In Situ Techniques and their Application in Confined Treatment Facilities</i>
	<i>Panel Discussion and Question and Answer Session</i>
<i>Extraction Technologies</i>	<i>Review of Removal, Containment, and Treatment Technologies for Remediation of Contaminated Sediments in the Great Lakes</i>
	<i>Extraction Technology Research at RREL</i>
	<i>Low Energy Solvent Extraction Process</i>
	<i>Solvent Extraction Using the BEST Process</i>
	<i>Liquid Propane Extraction Using the CF Systems Process</i>
	<i>Panel Discussion and Question and Answer Session</i>
<i>Biological/Chemical Treatment Technologies</i>	<i>Biodegradation of Chlorinated Aromatic Hydrocarbons</i>
	<i>Chemical Treatment Research at RREL: Base Catalyzed Decomposition</i>
	<i>Biological Technologies in the SITE Program</i>
	<i>Panel Discussion and Question and Answer Session</i>
<i>Other Technologies of Interest</i>	<i>Low Temperature Thermal Treatment Technologies</i>
	<i>Ultraviolet/Ozonation SITE Project</i>
	<i>Solidification/Stabilization of Dredged Materials and Sediment</i>
	<i>Panel Discussion and Question and Answer Session</i>
<i>Future Direction for Contaminated Sediments Treatment</i>	<i>Issues Identification and Presentation</i>
	<i>Open Discussion (including legislative issues)</i>

risk assessment methodology, the determination of target and action levels, improved understanding of the natural environment, and relative costs of sediment treatment vs. confinement. Some questions addressed communication among interested parties [e.g., EPA Headquarters, RREL, Superfund Innovative Technology Evaluation (SITE) Program, U.S. Army Corps of Engineers, Bureau of Mines, National Pollutant Discharge Elimination System (NPDES) Enforcement, National Oceanic and Atmospheric Administration (NOAA)] to prevent duplication of efforts.

Representatives from OWRS presented a brief description of EPA's recent efforts regarding contaminated sediments management. They announced that the Sediment Oversight Technical Committee recently drafted a "Sediment Classification Methods Compendium," which describes various methods to assess the quality of sediments containing unknown concentrations of toxic compounds. Four work groups are developing 14 papers that will provide the basis for an Agency-wide sediment management strategy. The Assessment and Remediation of Contaminated Sediments (ARCS)

Program's Engineering Technology Work Group recently completed a technology screening report. Selected technologies profiled in the report have been chosen for bench-scale testing, which is scheduled to begin soon. This workshop, sponsored by RREL, OWRS, and GLNPO, was convened to provide a forum for exchanging this type of information.

The full report was submitted in fulfillment of EPA Contract No. 68-03-3413, Work Assignment No. 2-66, by PEI Associates, Inc., under the sponsorship of the U.S. Environmental Protection Agency.



Photo 2. Workshop attendees participate in panel discussions.

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Jonathan G. Herrmann is the EPA Project Officer (see below).

The complete report, entitled "Workshop on Innovative Technologies for Treatment of Contaminated Sediments, June 13-14, 1990, Summary Report," (Order No. PB91-148296/AS; Cost: \$17.00, subject to change) will be available only from:

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