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Environmental Site Characterization and Remediation Design Guidance

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Environmental Site Characterization and Remediation Design Guidance

Prepared by the
Remedial Investigation/Feasibility Study/Remediation Design
Manual Task Committee of the
Environmental Engineering Division of the
American Society of Civil Engineers

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Abstract: Soils and groundwater contaminated by hazardous compounds are common results of industrial activity. They have become costly burdens for site owners and contentious political and regulatory issues for surrounding communities. *Environmental Site Characterization and Remediation Design Guidance* provides information for consultants, engineers, site owners, insurers, realtors, and facilities managers who must evaluate and remediate these chemical hazards. It describes procedures for site characterization, linking it to a related ASCE manual, *Environmental Site Investigation*. It reviews methods for evaluating the array of available remediation techniques and selecting the one that will provide the best combination of reliability and low cost for the site of interest. It outlines an organized and rational approach to remediation design. Regulatory compliance and responsibility to the community are emphasized, but with attention to approaches that allow remediation to be completed at minimum cost.

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99	Environmental Site Characterization and Remediation Design Guidance

COMMITTEE'S PURPOSE AND OFFICERS

Environmental Engineering Division, Remedial Investigation/Feasibility Study/Remediation Design Manual Task Committee

This manual was written by the Remedial Investigation/Feasibility Study/ Remediation Design (RI/FS/RD) Manual Task Committee of the Environmental Engineering Division of the American Society of Civil Engineers. The Task Committee's purpose was to prepare a manual describing the appropriate procedures to design the remediation of sites contaminated with hazardous materials.

Title	Member	Affiliation
Chair	Joseph S. Devinny, Ph.D.	Environmental Engineering Program Civil Engineering Department University of Southern California Los Angeles, California
Vice Chair	Khalique Khan	Sverdrup Corporation Costa Mesa, California
Secretary	Daniel F. Buss	Camp Dresser & McKee, Inc. Milwaukee, Wisconsin
Planner	Victor F. Medina	Washington State University–Tri-Cities Richland, Washington

Major Contributors

The following individuals were major contributors to the preparation and final production of this manual. The lead authors prepared the preliminary drafts of their assigned chapters as recognized experts in their disciplines. These chapters were given an initial internal review, revised, given a

second internal review, and revised again. The draft was then reviewed by all the members of the committee, and comments were incorporated into the draft. The appointed ASCE Blue Ribbon Committee, with membership from throughout the country, critiqued the draft, and those comments were incorporated to produce the final manuscript. Wendy Cohen, from the California Regional Water Quality Control Board, edited the final draft of the manuscript.

Lead Authors

Chapter 1	Joseph S. Devinny	University of Southern California Los Angeles, California
	Sidney B. Garland II	Lockheed Martin Energy Systems, Inc. Oak Ridge, Tennessee
Chapter 2	Julio Nuno Patrick S. Sullivan	SCS Engineers Long Beach, California
	Daniel F. Buss	Camp Dresser & McKee, Inc. Milwaukee, Wisconsin
	Raymond D'Hollander	Blasland, Bouck & Lee, Inc. Syracuse, New York
Chapter 3	Kenneth H. Lister	SCS Engineers Long Beach, California
	M'balia Tagoe	Bechtel Jacobs Company Oak Ridge, Tennessee
Chapter 4	John April	Bechtel Hanford, Inc. Richland, Washington
	Charlie Johnson	Bechtel Jacobs Company Oak Ridge, Tennessee
	Khalique Khan	Sverdrup Corporation Costa Mesa, California
Chapter 5	David P. Williams	U.S. Army Corps of Engineers Alaska District Anchorage, Alaska

Blue Ribbon Committee

Carol Whitlock	Merriam, Kansas
Robert Williams	ATSDR Norcross, Georgia

Richard Reis, P.E.	Emcon Bothell, Washington
Yee Cho, P.E.	CDW Consultants Framingham, Massachusetts
F. Edward Reynolds, Jr., P.E.	The Reynolds Group Tustin, California
Tom Card	Environmental Management Consulting Fall City, Washington
Fred Boecher	U.S. Army Environmental Center Aberdeen Proving Ground, Maryland
Bijay Panigrahi	Remedial Engineering and Science Orlando, Florida

Technical Editors

Joseph S. Devinny, Ph.D.	University of Southern California Los Angeles, California
Wendy L. Cohen	California Regional Water Quality Control Board Central Valley Region Sacramento, California
Daniel F. Buss	Camp Dresser & McKee Inc. Milwaukee, Wisconsin
Khalique Khan, Ph.D.	Sverdrup Corporation Costa Mesa, California
Stanley Klemetson	Anderson Consulting Group Roseville, California

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ACRONYMS

ARARs	Applicable or Relevant and Appropriate Requirements
CDI	chronic daily intake
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COPCs	chemicals of potential concern
DQO	data quality objectives
EPA	U.S. Environmental Protection Agency
EPC	exposure point concentration
ESC	environmental site characterization
HRA	health risk assessment
HSWAs	Hazardous and Solid Waste Amendments
NCP	National Contingency Plan
NEPA	National Environmental Policy Act of 1969
NPL	National Priorities List
O&M	operations and maintenance
OSHA	U.S. Office of Safety and Health Administration
PRGs	preliminary remediation goals
QA/QC	quality assurance/quality control
RAB	restoration advisory board
RCRA	Resource Conservation and Recovery Act
RI	remedial investigation
ROD	record of decision
SOW	statement of work
SARA	Superfund Amendments and Reauthorization Act
VE	value engineering
VISITT	Vendor Information System for Innovative Treatment Technologies
VOCs	volatile organic compounds

Chapter 1
INTRODUCTION

1.1 PURPOSE

This manual describes the characterization and design processes for cleanup of sites contaminated by hazardous materials. It is intended for individuals and companies that become responsible for contaminated site characterization and remediation but do not have the experience or expertise of specialized professionals.

Site cleanup includes remediation planning; site characterization; evaluation and selection of remediation alternatives; and remediation design, construction, and implementation. This manual summarizes site characterization, then details evaluation of alternatives and remediation design. Because all sites are different and simple cleanup procedures may be possible in many cases, a chapter is included that describes expedited processes. A previous manual, the *Environmental Site Investigation Guidance Manual* (ASCE 1996), provides a more detailed description of the investigation step. It is anticipated that a future ASCE manual will discuss remedial construction and implementation.

1.2 BACKGROUND

Ideally, environmental management prevents significant contamination of the environment (Figure 1-1). Poor environmental management may lead to contamination of soils and groundwater. If the contamination threatens the environment or public health, remediation will frequently be required. Unfortunately, past hazardous materials handling and hazardous waste treatment and disposal were often done carelessly. Wastes were initially dumped without treatment. Later, wastes were treated, and process changes were made to reduce the amounts produced. Now, emphasis is