Chapter 1
Introduction

NOTICE

This document provides a reference resource to EPA and other staff addressing characterization and cleanup of abandoned mine sites. The document does not, however, substitute for EPA statutes, regulations and guidance, 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 on the circumstances. EPA may change this reference document in the future, as appropriate.

1.1 Introduction

The Abandoned Mine Site Characterization and Cleanup Handbook (Handbook) has been developed by the Environmental Protection Agency as a resource for project managers working on addressing the environmental concerns posed by inactive mines and mineral processing sites. **The information contained in the Handbook is not policy or guidance, rather it a compendium of information gained during many years of experience on mine site cleanup projects.** This information was developed primarily for EPA staff, but may also prove useful to others working on mine site characterization and cleanup projects, including: states, other federal agencies, tribes, local government, public interest groups, and private industry. Handbook users are encouraged to refer to appropriate agency guidance and/or policy during development of site specific mine site investigation and cleanup projects.

Earlier drafts of this document focused on the tools available for mine site cleanup under the authorities of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). However, with the recent release of EPA's National Hardrock Mining Framework, the agency has stated its preference that a broad range of regulatory and non-regulatory tools be considered in implementing inactive mine site cleanup projects. Consistent with the recognition of the need for a more flexible approach, the title Superfund Mine Waste Reference Document, has been replaced.

This handbook focuses on environmental hazards at abandoned mining sites. At many sites, however, physical hazards (e.g., open shafts or adits, unstable buildings, unstable slopes, etc.) present a safety hazard to the investigators and/or general public. These safety hazards also deserve careful consideration in developing site management strategies but are not considered in this document.

EPA's National Hardrock Mining Framework emphasizes the need for developing partnerships in addressing the environmental concerns posed by inactive mines. This manual reflects the same philosophy. Effective partnerships will assist in dealing with the difficult issues often posed by mine sites, including: extensive areas of contamination, complex land ownership patterns, liability issues, overlapping jurisdictions, and long term management considerations. Often in evaluating cleanup options at mine sites, a watershed approach to assessing environmental impacts will be required to understand the scope of potential problems and design appropriate solutions. Partnerships can facilitate the design of cleanup strategies that address multiple interests within a watershed. Collaborative efforts to set priorities for mine site cleanup, coupled with utilization of the appropriate mix of regulatory and non-regulatory tools for getting the work done, should result in successful projects.
Because this handbook was originally written for use by CERCLA program staff there are

frequent references to guidance or other references developed under the auspices of Superfund. This does not suggest that CERCLA authorities are to be applied at each abandoned mine site. Rather, these references are provided to the reader as resources to be considered in developing site characterization and cleanup strategies under whatever regulatory or non-regulatory approach that is appropriate at a particular site. Experience has demonstrated that the conceptual framework utilized in the CERCLA process is effective in investigating environmental concerns and identifying appropriate cleanup actions; however users of this Handbook are encouraged to consider the information provided here in the context of site specific considerations.

1.2 Contents of Handbook

The Abandoned Mine Site Impact Characterization and Cleanup Handbook is divided into several chapters, each dealing with an issue that is important in either site investigation, cleanup, or long-term management.

Chapter 1: Introduction, this chapter, introduces the Handbook to readers.

Chapter 2: Overview of Mining and Mineral Processing Operations introduces users to the types of operations, related wastes, and waste management practices typical of mine sites and mineral processing facilities. Knowledge of the historical operations that took place on the site will aid the project manager during site scoping, site characterization, and the cleanup alternative selection process.

Chapter 3: Environmental Impacts from Mining introduces site managers to the types of impacts abandoned mining operations can have on the environment. Knowledge of these impacts will be important during site scoping, characterization, and cleanup alternative selection. This background information provides valuable insight into the contaminants that may be present, potential threats to human health and the environment, and feasibility of response actions.

Chapter 4: Setting Goals and Measuring Success outlines considerations in setting goals for mine site cleanup and in assessing the success of mine site cleanup initiatives. The chapter covers the coordination among federal and state agencies in determining the goals that need to be met and resolving conflicts between different goals in different agencies. The chapter further discusses how a site manager can “measure” the success of meeting the goals that were set for the site.

Chapter 5: Community Involvement at Mining Waste Sites provides information regarding community involvement planning for site investigation and cleanup work at mining waste sites. Community involvement planning should parallel all aspects of the site cleanup process from the onset of scoping to conclusion of site work. While the relevant public participation requirements of the statutes under which the cleanup is taking place must be met, these activities represent only a starting point for community involvement at many sites. Additional guidance on Superfund community involvement requirements and other community involvement activities can be found in *Superfund Community Involvement Handbook & Toolkit.*

Chapter 6: Scoping Studies of Mining and Mineral Processing Impact Areas provides an overview of the scoping process at abandoned mining and mineral processing sites. The first section of the chapter presents background information on the scoping process in general. The individual tasks associated with the scoping process can be found in Chapter 2 of the *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA.* The remainder of the chapter addresses the problems and issues the site manager should consider when scoping an abandoned mining or mineral processing site.

Chapter 7: Sampling and Analysis of Impacted Areas outlines concepts and issues related to designing and implementing a sampling and analysis program for characterizing mining and mineral processing site waste management areas. The chapter presents general information about the sampling and analysis process. The individual tasks associated with sampling and analysis can be found in Chapters 3 and 4 of the *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA*. Mining and mineral processing sites present many problems and issues that are not characteristic of other sites. The chapter presents unique characteristics of mining and mineral processing sites and briefly discuss how these characteristics can affect the sampling and analysis program. The remainder of the chapter addresses issues associated with sampling and analysis at abandoned mining and mineral processing sites.

Chapter 8: Scoping and Conducting Ecological and Human Health Risk Assessments at Superfund Mine Waste Sites discusses environmental and human health considerations in risk assessment development. While not all mine sites will require that a risk assessment be completed, the process to determine risk will be similar to the CERCLA process that is presented here. The chapter highlights some of the unique issues related to risk assessments at mine waste sites and provides some guidance to help address these issues. This chapter furnishes Remedial Project Managers (RPMs), Site Assessment Managers (SAMs), Removal Managers, and other federal and state authorities with a summary of key issues relevant to mine waste site risk assessments as well as a compilation of references to other helpful resources.

Chapter 9: Site Management Strategies discusses options that a site manager may consider for managing risk at abandoned mining and mineral processing sites. The site manager can be a state, federal, tribal or local authority, or private landowner and be managing the site under a number of regulatory or non-regulatory programs. The characterization of the site and the risk assessment are used to identify the risks at the site. While these risks can be both environmental or physical, this discussion will focus on the environmental risk. As with any remediation project, strategic planning is critical in abandoned mine characterization initiatives as well as clean-up activities.

Chapter 10: Remediation and Cleanup Options identifies remediation and cleanup options to be considered in designing and implementing inactive mine site cleanup projects. The chapter will assist the user with a basic understanding of the types and availability of cleanup technologies for typical mining and mineral processing sites.

This chapter consists of three general sections. The first discusses technologies with demonstrated effectiveness at mine sites. The second section focuses on emerging or innovative technologies. The third section addresses institutional controls. Finally the last section identifies sources of information regarding available technologies and means of accessing this information

Chapter 11: The Regulatory "Toolbox" discusses the tools available to project managers in developing strategies for an abandoned mine site cleanup. Regulation of mining activities occurs via a complex web of sometimes overlapping jurisdictions, laws, and regulations covering several environmental media. Land ownership and tenancy issues further complicate regulatory considerations. Each abandoned mine site faces a somewhat unique set of regulatory requirements, depending on statute or regulation; whether it is on State, Federal, Tribal, or private land; local regulations; and the specific environmental considerations unique to the site.

The chapter begins with a general discussion of the use of CERCLA for remediating mining and mineral processing sites, then discusses applicability; implementation; enforcement; other Superfund tools; limitations; ability to interact with other statutes, and interaction with federal facilities. Finally, this chapter will discuss tools other than CERCLA that may be used at mining sites, including non-regulatory programs and initiatives.

The appendices provide additional information and references of selected topics.

Users of the Handbook are reminded that mine site cleanup projects are conducted against a complex backdrop of federal, state, tribal, and local regulations and policies. These often change. Similarly, considerable effort is now being devoted to developing more cost effective cleanup technologies for inactive mine sites. Therefore, readers are advised to refer to sources listed in the references in conjunction with using this manual to be certain to have the most up to date information available in designing site characterization and cleanup projects. Other sources of information are Internet web pages, including those that can be reached through the EPA home page at http://www.epa.gov.