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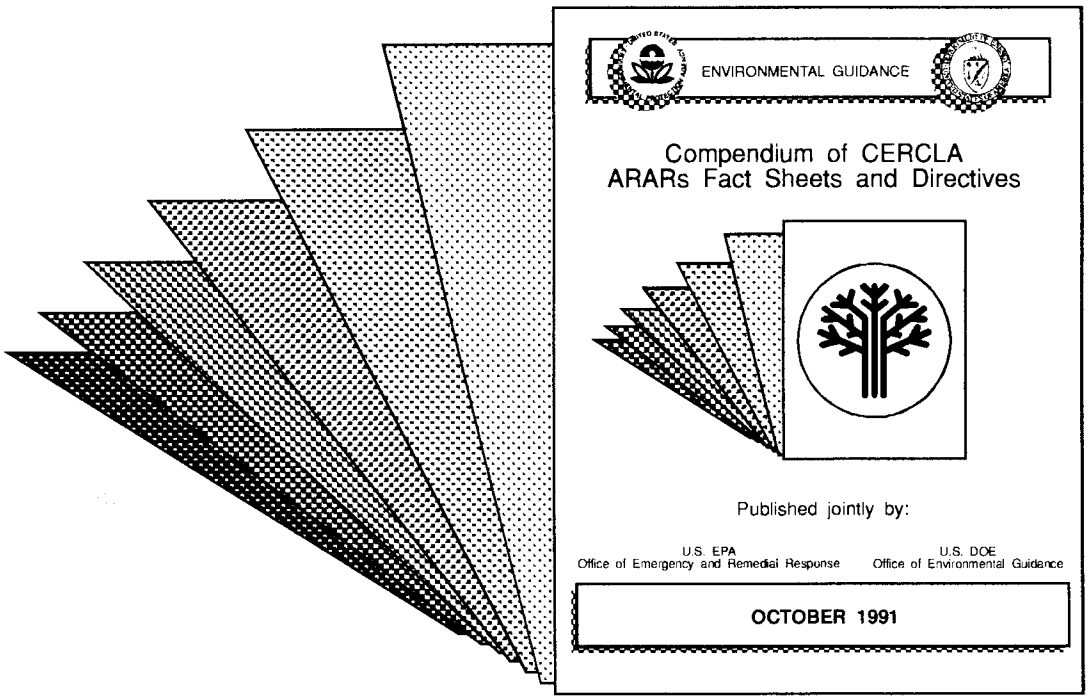
ENVIRONMENTAL GUIDANCE

Compendium of CERCLA ARARs Fact Sheets and Directives



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United States Government **Department of Energy**
Environmental Protection Agency

memorandum

DATE: October 18, 1991

REPLY TO
ATTN OF: EH-231

SUBJECT: Compendium of Applicable or Relevant and Appropriate Requirements "Quick Reference Fact Sheets" and Directives

TO: Distribution

Through a collaborative effort, the Department of Energy (DOE) and the Environmental Protection Agency (EPA) have prepared the attached compendium of EPA "Quick Reference Fact Sheets" and directives on applicable or relevant and appropriate requirements (ARARs). This compilation replaces the earlier "Catalog of CERCLA ARARs-Fact Sheets," which DOE issued in July 1990.

The purpose of this compendium is to provide you with a current list of all ARAR "Quick Reference Fact Sheets" and directives. These fact sheets and directives were developed by EPA's Office of Solid Waste and Emergency Response. EPA prepared these fact sheets to assist those involved in the conduct of response actions in complying with Section 121 (d), "Degree of Cleanup," of CERCLA as amended by SARA and 40 CFR Part 300, Subpart E, Section 300.400(g) "Identification of applicable or relevant and appropriate requirements" of the NCP.

The Compendium of CERCLA ARARs consists of seven (7) chapters: Chapter I, "Introduction," lists general fact sheets that provide introductory information on ARARs; Chapter II, "Air," discusses air emissions from air strippers at CERCLA sites; Chapter III, "Indian Tribal ARARs," deals with Indian Tribal involvement in the CERCLA program; Chapter IV, "Lead," discusses soil lead cleanup levels at CERCLA sites; Chapter V, "Risk Assessment," discusses the risk associated with CERCLA cleanups; Chapter VI, "RCRA ARARs," contains four sections that discuss a variety of RCRA ARARs such as general guidance topics, land disposal restrictions, Superfund LDR guides, and toxicity characteristics; and finally, Chapter VII, "Water," lists a variety of ARAR fact sheets and directives on water.

Also, EPA, DOE, and other Federal Agencies (Army, Navy, Department of Defense, Department of the Interior, and NASA) are working together to develop the ARARs-Assist system. ARARs-Assist is a computerized database system that will facilitate the identification of potential Federal and State ARARs.

Questions concerning the attached compendium, in particular, or the ARARs-Assist system, should be directed to Jerry DiCerbo at DOE, (202) 586-5047 or Rhea Cohen at EPA, (202) 260-2200.

Raymond F. Pelletier, Director
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Introduction

Section 121 (d) of the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), requires attainment of Federal and State applicable and relevant and appropriate requirements (ARARs). Subpart E, Section 300.400(g) "Identification of applicable or relevant and appropriate requirements" of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (55 CFR 8666, March 8, 1990) describes the process for attaining ARARs.

The purpose of this compendium is to provide you with a complete and current source of "Quick Reference Fact Sheets" and Directives on applicable and relevant and appropriate requirements (ARARs). These fact sheets, prepared by the Environmental Protection Agency's (EPA) Office of Solid Waste and Emergency Response, provide overviews of the ARARs for CERCLA cleanup actions.

The Department or Energy and the EPA prepared this compendium of EPA "Quick Reference Fact Sheets" and Directives on ARARs. This compilation is provided as general guidance for complying with the Federal requirements on ARARs.[1]

The Compendium of CERCLA ARARs consists of seven (7) chapters: Chapter I, "Introduction," lists general fact sheets that provide introductory information on ARARs; Chapter II, "Air," discusses air emissions from Superfund air strippers; Chapter III, "Indian Tribal ARARs," deals with Indian Tribal involvement in the Superfund program; Chapter IV, "Lead," discusses soil lead cleanup levels at Superfund sites; Chapter V, "Risk Assessment," discusses the risk associated with Superfund cleanups; Chapter VI, "RCRA ARARs," contains four sections that discuss a variety of RCRA ARARs such as general guidance topics, land disposal restrictions, Superfund LDR guides, and toxicity characteristics; and finally, Chapter VII, "Water" contains a variety of ARAR fact sheets and directives on Wastewater, Safe Drinking Water Act and Groundwater.

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[1] This compendium supersedes the July 1990, "Catalog of CERCLA Applicable or Relevant and Appropriate Requirements (ARARs) - Fact Sheets," DOE-EGD (CERCLA)-002/0790.

TABLE OF CONTENTS

I. INTRODUCTION

A. Overview

1. CERCLA Compliance with Other Laws Manual, Guide to Manual; 9234.2-02/FS, September 1989

2. CERCLA Compliance with Other Laws Manual, Overview of ARARs Focus on ARARs Waivers; OSWER 9234.2-03/FS, December 1989

3. ARARs Q'and A's: General Policy, RCRA, CWA, SDWA, Post-ROD Information, and Contingent Waivers; 9234.2-01/FS-A, June 1991

4. CERCLA Compliance with Other Laws Manual, Summary of Part II CAA, TSCA, and Other Statutes; OSWER 9234.2-07/FS, April 1990

5. ARARs Q's and A's Fund Balancing Waiver; OSWER 9234.2-13/FS, January 1991

6. A Guide to Selecting Superfund Remedial Actions; OSWER 9355.0-27/FS, April 1990

B. State and Local Requirements

7. CERCLA Compliance with Other Laws Manual, CERCLA Compliance with State Requirements; OSWER 9234.2-05/FS, December 1989

8. State and Local Involvement in the Superfund Program; OSWER 9375.5-01/FS, Fall 1989

II. AIR

9. Control of Air Emissions from Superfund Air Strippers at Superfund Groundwater Sites; OSWER 9355.0-28, June 15, 1989

III. INDIAN TRIBAL ARARs

10. Indian Tribal Involvement in the Superfund Program; OSWER 9375.5-02/FS, Fall 1989

IV. LEAD

11. Interim Guidance on Establishing Soil Lead Cleanup Levels at Superfund Sites; OSWER 9355.4-02, September 7, 1989

V. RISK ASSESSMENT

12. Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual; OSWER 9285.7-01/FS, April 1990

13. Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions; OSWER 9355.0-30, April 22, 1991

VI. RCRA

A. Guidance Topics

14. Interim RCRA/CERCLA Guidance on Non-Contiguous Sites and On-Site Management of Waste and Treatment Residue; OSWER 9347.0-1, March 27, 1986

15. A Guide to Delisting of RCRA Wastes for Superfund Remedial Responses; OSWER 9347.3-09/FS, September 1990

16. CERCLA Compliance with Other Laws Manual, RCRA ARARs: Focus on Closure Requirements; OSWER 9234.2-04/FS, October 1989

17. Consideration of RCRA Requirements in Performing CERCLA Responses at Mining Waste Sites; OSWER 9234.0-4; August 19, 1986

B. Land Disposal Restriction

18. Policy for Superfund Compliance with the RCRA Land Disposal Restrictions; OSWER 9347.1-02, April 17, 1989

19. Regional ARARs and LDR [Land Disposal Restriction] Contacts; OSWER 9234.1-03, March 1988

20. Land Disposal Restrictions as Relevant and Appropriate Requirements for CERCLA Contaminated Soil and Debris; OSWER 9347.2-01, June 5, 1989

21. Applicability of Land Disposal Restrictions to RCRA and CERCLA Ground Water Treatment Reinjection, Superfund Management Review: Recommendation No. 26; OSWER 9234.1-06, December 27, 1989

C. Superfund LDR Guides

22. Superfund Land Disposal Restriction Guide #1, Overview of RCRA Land Disposal Restrictions (LDRs); OSWER 9347.3-01/FS, July 1989

23. Superfund Land Disposal Restriction Guide #2, Complying with California List Restrictions Under Land Disposal Restrictions (LDRs); OSWER 9347.3-02/FS, July 1989

24. Superfund Land Disposal Restriction Guide #3, Treatment Standards and Minimum Technology Requirements Under Land Disposal Restrictions (LDRs); OSWER 9347.3-03/FS, July 1989

25. Superfund Land Disposal Restriction Guide #4, Complying with the Hammer Restrictions Under Land Disposal Restrictions (LDRs); OSWER 9347.3-04/FS, July 1989

26. Superfund Land Disposal Restriction Guide #5, Determining When Land Disposal Restrictions (LDRs) are Applicable to CERCLA Response Actions; OSWER 9347.3-05/FS, July 1989

27. Superfund Land Disposal Restriction Guide #6A (2nd Edition), Obtaining a Soil and Debris Treatability Variance for Remedial Actions; OSWER 9347.3-06/FS, September 1990

28. Superfund Land Disposal Restriction Guide #6B, Obtaining a Soil and Debris Treatability Variance for Removal Actions; OSWER 9347.3-06B/FS, September 1990

29. Superfund Land Disposal Restriction Guide #7, Determining When Land Disposal Restrictions (LDRs) are Relevant and Appropriate to CERCLA Response Actions; OSWER 9347.3-08/FS, December 1989

30. Superfund Land Disposal Restriction Guide #8, Compliance with Third Third Requirements Under Land Disposal Restrictions; 9347.3-08/FS, October 1990

D. Toxicity Characteristics

31. ARARs Q's & A's Compliance with Toxicity Characteristics, Part I; OSWER 9234.2-08/FS, May 1990

32. CERCLA Compliance with RCRA Toxicity Characteristics, Part II; OSWER 9347.3-11/FS, October 1990

VII. WATER

33. CERCLA Compliance with Other Laws Manual, CERCLA Compliance with CWA and SDWA; OSWER 9234.2-06/FS, February 1990

34. Discharge of Wastewater from CERCLA Sites into POTWs; OSWER 9330.2-4, April 15, 1986

35. ARARs Q's and A's: Compliance with Federal Water Quality Criteria; OSWER 9234.2-09/FS, June 1990

36. ARARs Q's and A's: State Ground-Water Antidegradation Issues; OSWER 9234.2-11/FS, July 1990

37. ARARs Q's and A's Compliance with New SDWA National Primary Drinking Water Regulations for Organic and Inorganic Chemicals; OSWER 9234.2-15/FS, August 1991

CERCLA Compliance with Other Laws Manual
Guide to Manual

1

United States Environmental Protection Agency

Office of Solid Waste and Emergency Response

Directive 9234.2-02FS
September 1989

EPA

CERCLA Compliance with Other Laws Manual

GUIDE TO MANUAL

The 1986 Superfund Amendments and Reauthorization Act (SARA) adopts and expands a provision in the 1985 National Contingency Plan (NCP) that remedial actions must at least attain applicable or relevant and appropriate requirements (ARARs). Section 121(d) of CERCLA, as amended by SARA, requires attainment of Federal ARARs and of State ARARs in State environmental or facility siting laws when the State requirements are promulgated, more stringent than Federal laws, and identified by the State in a timely manner. Under EPA regulation and policy, removal actions must comply with ARARs to the extent practicable.

To implement the ARARs provision, EPA has developed guidance, CERCLA Compliance with Other Laws Manual: Parts I and II (OSWER Directives 9234.1-01 and 9234.1-02, respectively). EPA is preparing a series of short fact sheets that summarize the guidance document (OSWER Directives 9234.2 series). This Fact Sheet provides a guide to the compliance manual. The compliance manual is based on policies set forth in the proposed December 21, 1988 revisions to the NCP. The final NCP may adopt policies different from those covered here and should, when promulgated, be considered the authoritative source.

I. PURPOSE OF MANUAL

The CERCLA Compliance with Other Laws Manual is intended to assist in the identification and evaluation of ARARs for removal and remedial actions. The manual provides guidance to Remedial Project Managers, On-Scene Coordinators, State personnel, and others responsible for or assisting in response actions under sections 104, 106, and 122 of CERCLA. The manual is also intended to assist in the selection of on-site remedial actions that meet the ARARs of the Resource Conservation and Recovery Act (RCRA), the Clean Water Act (CWA), the Safe Drinking Water Act (SDWA), the Clean Air Act (CAA), the Toxic Substances Control Act (TSCA), the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), and other Federal and State environmental laws, as required by CERCLA section 121. In general, different ARARs for a site and its remedial action will be identified at various points in the remedy selection process.

II. DEFINITIONS OF ARARS

A requirement under other environmental laws may be either "applicable" or "relevant and appropriate," but not both. Identification of ARARs must be done on a site-specific basis and involves a two-part analysis: first, a determination of whether a given requirement is applicable; then, if it is not applicable, a determination of whether it is nevertheless both relevant and appropriate.

DEFINITIONS:

- **Applicable requirements** are those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under Federal or State law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site.

- **Relevant and appropriate requirements** are those same standards mentioned above that while not "applicable" at the CERCLA site, address problems or situations sufficiently similar to those encountered at the site that their use is well suited to the particular site.

On-site actions are required to comply with ARARs, but must comply only with the substantive parts of an applicable or relevant and appropriate requirement. Off-site actions must comply only with legally applicable requirements, but must comply fully with both substantive and administrative requirements.

III. CONTENTS OF MANUAL

Part I describes general procedures for identifying ARARs and complying with ARARs in RCRA, CWA, SDWA, and ground-water policies. Part I is organized as follows:

- **Chapter 1, General Procedures for CERCLA Compliance with Other Statutes** - defines the terms "applicable" and "relevant and appropriate," describes general procedures for identifying and analyzing requirements, identifies waivers from ARARs, and provides matrices listing types of potential ARARs from RCRA, CWA, and SDWA.

- **Chapter 2, Guidance for CERCLA Compliance with RCRA** - discusses RCRA hazardous waste requirements and policies for determining when RCRA requirements are ARARs for CERCLA actions, including what actions at a CERCLA site constitute "disposal," as defined by RCRA.

- **Chapter 3, Guidance for Compliance with Clean Water Act Requirements** - provides guidance for compliance with CWA substantive requirements for direct discharges, indirect discharges, and dredge-and-fill activities.

- **Chapter 4, Guidance for Compliance with Requirements of the Safe Drinking Water Act** - provides guidance for compliance with SDWA requirements that may be ARARs, including drinking water standards and the requirements for underground injection control, sole-source aquifers, and the wellhead protection program.

- **Chapter 5, Ground Water Protection Policies** - discusses ground-water classification, provides guidance on consistency with policies for ground-water protection, and includes a hypothetical scenario for illustrating how ARARs are identified and used.

- **Appendix A** provides an overview of the major environmental statutes and regulations covered in Part I.

Part II of the manual describes general procedures for complying with ARARs in CAA, TSCA, FIFRA, other resource protection statutes, mining waste statutes, and State ARARS. Part II is organized as follows:

- **Chapter 1, Introduction and Overview** - provides an introduction and overview of Part II of the guidance manual and includes matrices of potential ARARs covered in Part II.

- **Chapter 2, Clean Air Act Requirements and Related RCRA and State Requirements** - provides guidance for compliance with CAA requirements (including the National Ambient Air Quality Standards, the National Emissions Standards for Hazardous Air Pollutants, and the New Source Performance Standards) and related RCRA and State requirements for air emissions.

- **Chapter 3, Standards for Toxics and Pesticides** - provides guidance for compliance with statutes (i.e., TSCA and FIFRA) that address toxic substances (particularly PCBs) and pesticides.

- **Chapter 4, Other Resource Protection Statutes** - provides guidance for compliance with other resource protection statutes, including the National Historic Preservation Act, the Archeological and Historic Preservation Act, the Endangered Species Act, the Wild and Scenic Rivers Act, the Fish and Wildlife Coordination Act, the Coastal Zone Management Act, and the Wilderness Act.

- **Chapter 5, Standards, Advisories, and Guidance for the Management of Radioactive Waste** - discusses potential ARARs and potentially useful guidance for cleaning up radioactively contaminated sites and buildings. Major acts discussed include the Uranium Mill Tailings Radiation Control Act, the Atomic Energy Act, the Nuclear Waste Policy Act, CAA, and CWA.

- **Chapter 6, Potential ARARs For CERCLA Actions at Mining, Milling, or Smelting Sites** - provides guidance for compliance with statutes incorporating standards for mining, milling, or smelting sites, including the Surface Mining Control and Reclamation Act and RCRA.

- **Chapter 7, CERCLA Compliance with State Requirements** discusses eligibility requirements for State programs, specific types of State laws (e.g., siting requirements), and procedures for communicating State ARARs.

- **Appendix A** provides guidance for compliance with CAA Part C requirements under the Prevention of Significant Deterioration program.

- **Appendix B** describes Federal/State relationships under major Federal environmental statutes, including whether the statute allows for State authorization of the program and whether the State provisions are identical or more stringent than the Federal requirements.

CERCLA Compliance With Other Laws Manual
Overview of ARARs
Focus of ARARs Waivers

2

United States Environmental Protection Agency

Office of Solid Waste and Emergency Response

Publication 9234.2-03/FS

December 1989

EPA

CERCLA Compliance With Other Laws Manual

Overview of ARARs

Focus on ARAR Waivers

Office of Emergency and Remedial Response
Office of Program Management OS-240

Quick Reference Fact Sheet

The Superfund Amendments and Reauthorization Act of 1986 (SARA) adopts and expands a provision in the 1985 National Contingency Plan (NCP) that remedial actions must at least attain applicable or relevant and appropriate requirements (ARARs). Section 121(d) of CERCLA, as amended by SARA, requires attainment of Federal ARARs and of State ARARs in State environmental or facility siting laws when such requirements are promulgated, are more stringent than Federal laws, and are identified by the State in a timely manner.

To implement the ARARs provision, EPA has developed guidance, CERCLA Compliance With Other Laws Manual: Parts I and II (OSWER Directives 9234.1-01 and 9234.1-02). EPA is preparing a series of short fact sheets that summarize these guidance documents. This fact sheet summarizes Chapter 1 of Part I, which provides an overview of ARARs. The material covered here is based on policies in the proposed revisions to the NCP. The final NCP may adopt policies different from those covered here and should, when promulgated, be considered the authoritative source.

I. OVERVIEW OF ARARS

A. Statutory Provisions

CERCLA section 121(d)(2) states that for wastes left on-site, remedial actions must comply with Federal and State environmental laws that are legally applicable or are relevant and appropriate under the circumstances of the release. This section, in effect, codified and expanded on the 1985 NCP, which required compliance with Federal applicable or relevant and appropriate requirements (ARARs), a provision adopted to make use of other programs' or agencies' standards.

In addition, CERCLA requires Superfund remedial actions to comply with State environmental or facility siting laws provided that the State requirements: (1) are promulgated; (2) are more stringent than Federal laws; and (3) are identified by the State in a timely manner. CERCLA section 121(d) also mentions two criteria specifically -- Maximum Contaminant Level Goals (MCLGs) developed under the Safe Drinking Water Act (SDWA), and Water Quality Criteria (WQC) developed under the Clean Water Act (CWA) -- and requires that they be attained when they are relevant and appropriate (compliance with these criteria is discussed in a separate fact sheet). CERCLA also specifies six circumstances in which ARARs can be waived. The ARAR waivers are discussed in Part II of this fact sheet.

B. Compliance with ARARs for Removal Actions

Although CERCLA requires compliance with ARARs for remedial actions only, the current NCP requires that removal actions also comply with Federal ARARs, to the extent practicable. Furthermore, EPA policy under the proposed NCP requires that removal actions comply with both State and Federal ARARs to the extent practicable. Until this policy is promulgated by regulation, however, compliance with State ARARs during removal actions must be justified based upon protectiveness.

Factors used in determining whether removal compliance with ARARs is practicable include: (1) the urgency of the situation; and (2) the scope of the removal action to be conducted, which includes consideration of the statutory limits for removal actions. An example of a situation where compliance with ARARs is not practicable for a removal action would be a site where emergency conditions call for a rapid response, thereby preventing the on-scene coordinator from identifying and attaining ARARs. An ARAR that is beyond the scope of a removal to remediate top-level soil contamination due to leaking drums might be one that applies to lower-level soil remediation. Of course, such a standard may still be an ARAR for any remedial action that is subsequently taken at the site.

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C. Definitions of ARARs and TBCs

In the proposed revisions to the NCP (53 FR 51394), EPA clarified the definitions of "applicable" and "relevant and appropriate" requirements (see **Highlight 1**).

> **Highlight 1: DEFINITION OF "APPLICABLE" AND "RELEVANT AND APPROPRIATE" REQUIREMENTS**
>
> **Applicable requirements** are defined as "cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under Federal or State law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site."
>
> **Relevant and appropriate requirements** are defined as "substantive environmental protection requirements ... promulgated under Federal or State law that, while not "applicable", ... address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site."

1. Applicable Requirements

An applicable requirement directly and fully addresses the situation at the site. In other words, an applicable requirement is a substantive requirement that a private party would be subject to if it were undertaking the action independently from any CERCLA authority. For a requirement to be applicable, all jurisdictional prerequisites of the requirement must be met, including: (1) the party subject to the law; (2) the substances or activities that fall under the authority of the law; (3) the time period during which the law is in effect; and (4) the types of activities the statute or regulation requires, limits, or prohibits.

2. Relevant and Appropriate Requirements

While a determination of applicability is primarily a legal one, a determination of whether a requirement is relevant and appropriate is site-specific and is based on best professional judgment, taking into account the circumstances of the release or threatened release. This determination should be made in conjunction with pertinent national policies.

There is more flexibility and discretion in making relevant and appropriate determinations than in determining the applicability of a requirement. Only those requirements that are both relevant and appropriate are ARARs. A requirement may be relevant, but not appropriate, because of the site circumstances. Such a requirement would not be an ARAR for the site. Moreover, it is possible for only a portion of a requirement to be considered relevant and appropriate, while other parts may not. However, once a requirement (or part of a requirement) is found to be relevant and appropriate, it must be complied with to the same degree as if it were applicable.

In determining whether a requirement is both relevant and appropriate to the circumstances of the release, the following comparisons should be made:

- The purpose of the requirement and the purpose of the CERCLA action;
- The medium regulated or affected by the requirement and the medium contaminated or affected at the CERCLA site;
- The substances regulated by the requirement and the substances found at the CERCLA site;
- The actions or activities regulated by the requirement and the remedial action contemplated at the CERCLA site;
- Any variances, waivers, or exemptions of the requirement and their availability for use given the circumstances at the CERCLA site;
- The type of place regulated and the type of place affected by the CERCLA site or CERCLA action;
- The type and size of the structure or facility regulated and the type and size of the structure or facility affected by the release or contemplated by the CERCLA action; and
- Any consideration of the use or potential use of affected resources in the requirement and the use or potential use of the affected resource at the CERCLA site.

A similarity to any one factor is not necessarily sufficient to determine that a requirement is relevant and appropriate. Nor does a requirement have to be similar to the site situation with respect to each factor in order for it to be relevant and appropriate.

3. TBCs

By definition, ARARs are promulgated, or legally enforceable Federal and State requirements. (Because CERCLA identifies them as potentially relevant and appropriate, MCLGs and WQC are considered potential ARARs, even though they are not otherwise enforceable standards.) EPA has also developed another category of requirements, known as "to be considered" (TBCs), that includes nonpromulgated criteria, advisories, guidance,

and proposed standards issued by Federal or State governments. TBCs are not potential ARARs because they are neither promulgated nor enforceable. It may be necessary to consult TBCs to interpret ARARs, or to determine preliminary remediation goals when ARARs do not exist for particular contaminants. However, identification and compliance with TBCs is not mandatory in the same way that it is for ARARs.

D. Types of ARARs

EPA has divided ARARs into three categories to facilitate their identification:

- **Chemical-specific ARARs** are usually health- or risk-based numerical values or methodologies used to determine acceptable concentrations of chemicals that may be found in or discharged to the environment, e.g., MCLs that establish safe levels in drinking water.

- **Location-specific ARARs** restrict actions or contaminant concentrations in certain environmentally sensitive areas. Examples of areas regulated under various Federal laws include floodplains, wetlands, and locations where endangered species or historically significant cultural resources are present.

- **Action-specific ARARs** are usually technology- or activity-based requirements or limitations on actions or conditions involving specific substances.

Chemical- and location-specific ARARs are identified early in the process, generally during the site investigation, while action-specific ARARs are usually identified during the Feasibility Study (FS) in the detailed analysis of alternatives.

E. Compliance with ARARs for On-site and Off-site Actions

The ARARs provision in CERCLA addresses only on-site actions (see **Highlight 2** for definition of on-site). In addition, section 121(e) exempts on-site actions from having to obtain Federal, State, and local permits. Consequently, the requirements under CERCLA for compliance with other laws differ for on-site and off-site actions, as follows:

- On-site actions must comply with applicable and relevant and appropriate requirements, but need comply only with the substantive parts of those requirements.

- Off-site actions must comply only with requirements that are legally applicable, but must comply with both substantive and administrative parts of those requirements.

(See **Highlight 3** for definitions of "substantive" and "administrative".) Compliance with "relevant and appropriate" requirements is not required for off-site actions.

Highlight 2: DEFINITION OF "ON-SITE"

"On-site" is defined in the proposed revisions to the NCP as the "areal extent of contamination and all suitable areas in very close proximity to the contamination necessary for implementation of the response action." See 53 FR 51477 (December 21, 1988). "Areal extent of contamination" refers to both surface area, ground water beneath the site, and air above the site. Examples of on-site contamination and treatment units or staging areas separate from (but in "very close proximity to") the contamination include:

- A disposal site for treated wastes in a new landfill outside, but in close proximity to, a contaminated wetland;

- A point-source discharge into a river running through a site. The discharge point would be considered on-site, even if the discharge effluent ultimately runs off-site. The action would have to meet discharge limitations and monitoring requirements, but would not require an NPDES permit; and

- A pump-and-treat system located in the contamination plume several miles downgradient of the source. The ground-water treatment system is considered on-site.

Highlight 3: DEFINITIONS OF SUBSTANTIVE AND ADMINISTRATIVE REQUIREMENTS

- **Substantive requirements** are those requirements that pertain directly to actions or conditions in the environment. Examples include quantitative health or risk-based standards for certain hazardous substances (e.g., MCLs for drinking water), and technology-based standards (e.g., RCRA minimum technology requirements for double liners and leachate collection systems).

- **Administrative requirements** are those mechanisms that facilitate the implementation of the substantive requirements of a statute or regulation (e.g., requirements related to the approval of or consultation with administrative bodies, documentation, permit issuances, reporting, recordkeeping, and enforcement).

F. ARARs Documentation

ARARs considered for each alternative in the detailed analysis of alternatives should be documented in detail in the Remedial Investigation/Feasibility Study (RI/FS). The Proposed Plan and the ROD should summarize how the components of an alternative will comply with major ARARs, and should describe why the requirement is applicable or relevant and appropriate. The ROD should document ARARs as follows: (1) major ARARs should be discussed in the Description of Alternatives; (2) ARAR compliance should be summarized in the Summary of the Comparative Analysis; and (3) all ARARs selected for the remedy should be listed and briefly described in the Statutory Determinations section.

When an alternative is chosen that does not attain an ARAR, the basis for waiving the requirement must be fully documented and explained. TBCs referred to in the ROD should be listed and described briefly, as well as the reasons for their use. Generally, there is no need to document why a requirement is not an ARAR, although documentation should be provided for both ARARs and TBCs when the determination has been difficult or controversial. (See Guidance on Preparing Superfund Documents, [ROD Guidance] EPA-540/G-89/007, July 1989, and Guidance for Conducting RI/FSs Under CERCLA, EPA 540/G-89/004, October 1988, for further information.)

G. Policy on Newly Promulgated Requirements "Freezing" ARARs at the ROD

If a requirement that would be applicable or relevant and appropriate to the remedial action is promulgated after the Record of Decision (ROD) is signed and the ARARs for the selected remedy have already been established, the remedy will be evaluated in light of the new requirement to ensure that the remedy is still protective.

To the extent that the remedy remains protective in light of any new information reflected in the requirement, the original ARARs remain "frozen" at the ROD and nothing more needs to be done. However, if it is determined that the new requirement must be met in order for the remedy to be protective, the remedy must be modified to attain the requirement through an Explanation of Significant Differences (ESD) or ROD amendment. For example, a new requirement for a chemical at a site may indicate, through new scientific information on which it was based, that the cleanup level selected for the chemical corresponds to a cancer risk of 10^{-2} rather than 10^{-5}, as originally thought. The original remedy would have to be reevaluated in terms of the new requirement because it may no longer be protective.

II. FOCUS ON ARAR WAIVERS

CERCLA section 121(d) provides that, under certain circumstances, an ARAR may be waived. The six statutory waivers are provided in **Highlight Box 4** and are discussed more fully below. These waivers may not be used for off-site actions.

Highlight 4: STATUTORY ARAR WAIVERS

The six ARAR waivers provided by CERCLA are:

1. Interim Measures Waiver;
2. Equivalent Standard of Performance Waiver;
3. Greater Risk to Health and the Environment Waiver;
4. Technical Impracticability Waiver;
5. Inconsistent Application of State Standard Waiver; and
6. Fund-Balancing Waiver.

The Interim Measure waiver may be used when an interim measure that does not attain all ARARs is expected to be followed by a complete measure that will attain all ARARs (see **Highlight Box 5** for an example). The interim measure should not cause additional migration of contaminants, complicate the site response, or present an immediate threat to public health or the environment, and must not interfere with or delay the

Highlight 5: EXAMPLE OF INTERIM MEASURES WAIVER

At a mining site, interim measures were used to address drainage of contaminated water from a mine. The action involved passive treatment of mine tunnel discharges through construction of an artificial wetland, which would reduce contamination from the mine tunnel to the level of contamination present upstream. Since the discharge exceeded State ambient water quality standards for the stream, the standards were waived until the final remedy was implemented, which would address in-stream contamination.

final remedy. It should be noted, however, that if a requirement relates to some portion of the long-range site cleanup that is outside the scope of the immediate remedial action, it is not an ARAR for this action and a waiver is unnecessary.

The Equivalent Standard of Performance waiver may be used in situations where an ARAR stipulates use of a particular design or operating standard, but equivalent or better remedial results could be achieved using an alternative design or method of operation. In invoking this waiver, the alternative should be equal to or greater than the ARAR in terms of: (1) the degree of protection afforded; (2) the level of performance achieved; and (3) the potential to be protective in the future. The time required to achieve beneficial results using the alternative should be considered; however, the duration of the alternative should be balanced against other beneficial factors that may ensue from using the alternative. A technology-based requirement must be evaluated from a technology performance perspective, not from a risk perspective.

The Greater Risk to Health and the Environment waiver is available for situations where compliance with an ARAR will cause greater risk to human health and the environment than noncompliance. The more significant the risks, the longer they are in duration, and the more irreversible the harm from compliance with an ARAR, the more appropriate the use of this waiver (see **Highlight 6** for an example).

Highlight 6: EXAMPLE OF GREATER RISK TO HEALTH AND THE ENVIRONMENT WAIVER

A pump-and-treat system may be selected to remove ground water contamination from landfill releases. Analysis found that natural flushing through the landfill, after excavation of the highly contaminated waste, would facilitate cleanup of the ground water and remove residual contamination from the landfill. The waiver for greater risk was used to waive the applicable RCRA closure requirement for an impermeable cap, because such a cap would prevent natural flushing and would significantly delay and reduce the effectiveness of the ground water cleanup, and therefore the remedial action's effectiveness in reducing risk.

The Technical Impracticability waiver may be used when compliance with an ARAR is technically impracticable from an engineering perspective. The waiver can be used if either of two criteria are met: (1) engineering feasibility, in which current engineering methods necessary to construct and maintain an alternative that will meet the ARAR cannot reasonably be implemented; and (2) reliability, in which the potential for the alternative to continue to be protective into the future is low, either because the continued reliability of technical and institutional controls is doubtful, or because of inordinate maintenance costs. Use of the waiver may consider cost, although cost should not be the major factor (see **Highlight 7** for an example).

Highlight 7: EXAMPLE OF TECHNICAL IMPRACTICABILITY WAIVER

Ground water located in bedrock fractures and deep bedrock contained highly contaminated pockets of liquid waste along the fractures. MCLs were waived because their attainment was technically impracticable for several reasons, including: (1) difficulty in predicting the extent and location of fractures; (2) the inability to locate and extract all pockets of liquid waste; (3) excessive time frames for cleanup; and (4) the irregular nature of the fractures that made effective placement of extraction wells difficult.

The Inconsistent Application of State Standard waiver may be invoked when evidence exists that demonstrates that a State standard has not been or will not be consistently applied to other remedial sites within the State, including both NPL and non-NPL sites. A waiver may be used, for example, for a State standard that was promulgated but never applied, or for a standard that has been variably applied or enforced. A State standard is presumed to have been consistently applied unless there is evidence to the contrary.

The Fund-Balancing waiver may be invoked when meeting an ARAR would entail such cost in relation to the added degree of protection or reduction of risk afforded by that standard that remedial actions at other sites would be jeopardized. This waiver should be considered when the cost of attaining an ARAR is 20% of the annual remedial action budget or $100 million, whichever is greater (see **Highlight 8** for an example).

Highlight 8: EXAMPLE OF FUND-BALANCING WAIVER

The Fund-balancing waiver was invoked to waive compliance with State water quality standards because attaining these standards would have required removal and off-site disposal of more than 4 million cubic yards of contaminated ore, tailings, and bottom sediments in the streams and reservoir, at an estimated cost of $1.4 billion. At the time of ROD signature, the Fund had been nearly depleted, with remaining monies reserved for ongoing projects. The waiver allowed selection of a protective alternative of partial capping and surface water diversion, costing $72.2 million.

ARARs Q's and A's:
General Policy, RCRA, CWA, SDWA, Post-ROD Information, and Contingent Waivers

3

United States Environmental Protection Agency

Office of Solid Waste and Emergency Response

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EPA

ARARs Q's & A's: General Policy, RCRA, CWA, SDWA, Post-ROD Information, and Contingent Waivers

Office of Emergency and Remedial Response
Office of Program Management OS-240

Quick Reference Fact Sheet

Section 121(d)(2) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the 1986 Superfund Amendments and Reauthorization Act (SARA), requires that on-site remedial actions must attain (or waive) Federal and more stringent State applicable or relevant and appropriate requirements (ARARs) of environmental laws upon completion of the remedial action. The revised National Contingency Plan of 1990 (NCP) requires compliance with ARARs during remedial actions as well as at completion, and compels attainment of ARARs during removal actions to the extent practicable, considering the exigencies of the situation. See the NCP, 40 CFR section 300.415(i) (55 FR 8666, 8843) and section 300.435(b)(2) (55 FR 8666, 8852) (March 8, 1990).

To implement the ARARs provision, EPA has developed guidance, CERCLA Compliance With Other Laws Manual: Parts I and II (Publications 9234.1-01 and 9234.1-02), and has provided training to Regions and States on the identification of and compliance with ARARs. These "ARARs Q's and A's" are part of a series of Fact Sheets that provide guidance on a number of questions that arose in developing ARAR policies, in ARARs training sessions, and in identifying and complying with ARARs at specific sites. This particular Q's and A's Fact Sheet, **which updates and replaces a Fact Sheet first issued in May 1989**, addresses the ARARs general policy; compliance with the Resource Conservation and Recovery Act (RCRA), the Clean Water Act (CWA), and the Safe Drinking Water Act (SDWA); Post-ROD Information and Administrative Record requirements; and "contingency" waivers of ARARs.

I. General Policy

Q1. What difference does it make whether a requirement is "applicable" or "relevant and appropriate"? Why make that distinction?

A. It is true that once a requirement is determined to be relevant and appropriate, it must be complied with as if it were applicable. However, there are significant differences between the identification and analysis of the two types of requirements (see **Highlight 1**). "Applicability" is a legal and jurisdictional determination, while the determination of "relevant and appropriate" relies on professional judgment, considering environmental and technical factors at the site. There is more flexibility in the relevance and appropriateness determination: a requirement may be "relevant," in that it covers situations similar to that at the site, but may not be "appropriate" to apply for various reasons and, therefore, not well suited to the site. In some situations, only portions of a requirement or regulation may be judged relevant and appropriate; if a requirement is applicable, however, all substantive parts must be followed. (See Overview of ARARs: Focus on ARAR Waivers, Publication 9234.2-03/FS, December 1989, for further discussion on compliance with ARARs.)

For example, if closure requirements under Subtitle C of RCRA are applicable (e.g., at a landfill that received RCRA hazardous waste after 1980 or where the Superfund action constitutes disposal of hazardous waste), the landfill must be closed in compliance with one of the closure options available in Subtitle C regulations. These options are closure by removal (clean closure), which requires decontamination to health-based levels, or closure with waste in place (landfill closure), which requires impermeable caps and long-term maintenance.

However, if Subtitle C closure requirements are not applicable, but are determined to be relevant and appropriate, then a "hybrid closure," which includes other types of closure designs, may also be used. The hybrid closure option arises from a determination that only certain closure requirements in the two Subtitle C closure alternatives are relevant and appropriate. (See proposed NCP, 53 FR at 51446, and preamble to the NCP, 55 FR at 8743, for further discussion of RCRA closure requirements and the concept of hybrid closure.)

Highlight 1: DEFINITIONS OF "APPLICABLE" AND "RELEVANT AND APPROPRIATE"

"Applicable requirements mean those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility siting law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site." [Section 300.5 of the NCP, 55 FR at 8814] In other words, an applicable requirement is one with which a private party would have to comply by law if the same action was being undertaken apart from CERCLA authority. All jurisdictional prerequisites of the requirement must be met in order for the requirement to be applicable.

If a requirement is not applicable, it still may be relevant and appropriate. **"Relevant and appropriate requirements mean those cleanup standards [that] ... address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site."** [Section 300.5 of the NCP, 55 FR at 8817] A requirement that is relevant and appropriate may "miss" on one or more jurisdictional prerequisites for applicability but still make sense at the site, given the circumstances of the site and release.

Q2. Does an applicable requirement take precedence over one that is relevant and appropriate? In other words, if an applicable requirement is available, will that be the ARAR, rather than one that might otherwise be relevant and appropriate?

A. No, a requirement may be relevant and appropriate even if another requirement legally applies to that situation, particularly when the applicable requirement was not really intended to address the type or magnitude of problems encountered at Superfund sites. For example, RCRA Subtitle D requirements for covers for solid waste facilities may be applicable when RCRA hazardous waste is not present at the site. However, the soil cover required under Subtitle D may not always be sufficient to limit leachate at a Superfund site that has substantial amounts of waste similar to RCRA hazardous waste. In such a situation, some Subtitle C closure requirements may be relevant and appropriate to some parts of the site, even though Subtitle D requirements legally apply.

However, one factor that affects whether a requirement is relevant and appropriate is whether another requirement exists that more fully matches the circumstances at the site. In some cases, this might be a requirement that was directly intended for, and is applicable to, the particular situation. For example, Federal Water Quality Criteria generally will not be relevant and appropriate and, therefore, not ARAR when there is an applicable State Water Quality Standard promulgated specifically for the pollutant and water body, which therefore "more fully matches" the situation. (See Overview of ARARs: Focus on ARAR Waivers, Publication 9234.2-03/FS, December 1989, for further discussion on compliance with ARARs, and CERCLA Com-pliance With the CWA and SDWA, Publication 9234.2-06/FS, February 1990, for additional dis-cussion on the resolution of potentially conflicting water ARARs.)

Q3. Is compliance with ARARs required for a "no action" decision?

A. No. CERCLA Section 121 cleanup standards, including compliance with ARARs, apply only to remedial actions that the Agency determines should be taken under CERCLA Sections 104 and 106 authority. A "no action" decision can only be made when no remedial action is necessary to reduce, control, or mitigate exposure because the site or portion of the site is already protective of human health and the environment. See Guidance on Preparing Superfund Decision Documents (OSWER Directive 9355.3-02) for further discussion of "no action" decisions.

Q4. Does an ARAR always have to be met, even if it is not necessary to ensure protectiveness?

A. Yes, unless one of the six waivers can be used. Attainment of ARARs is a "threshold requirement" in SARA, as is the requirement that the remedies be protective of human health and the environment. If a requirement is applicable or relevant and appropriate, it must be met, unless an ARAR waiver can be used. ARARs represent the minimum that a remedy must attain; it may sometimes be necessary, where there are multiple contaminants with potentially cumulative or synergistic effects, to go beyond what ARARs require to ensure that a remedy is protective. (See Overview of ARARs: Focus on ARAR Waivers, Publication 9234.2-03/FS, December 1989 for further discussion on compliance with ARARs.)

Q5. If wastes from non-contiguous facilities are combined on one site for treatment, is the treatment viewed as off-site activity, and the unit therefore subject to permitting?

A. No. Because the combined remedial action constitutes on-site action, compliance with permitting or other administrative requirements would not be required (see **Highlight 2**). CERCLA Section 104(d)(4) authorizes EPA to treat two or more non-contiguous facilities as one site for purposes of response, if such facilities are reasonably related on

Highlight 2: ON-SITE VS. OFF-SITE ACTIONS

The requirements under CERCLA for compliance with other laws differ in two significant ways for on-site and off-site actions. **First, the ARARs provision applies only to on-site actions; off-site actions must comply fully only with any laws that legally apply to that action.** Therefore, off-site actions need only comply with "applicable" requirements, not with "relevant and appropriate" requirements; ARAR waivers are not available for requirements that apply to off-site actions.

Second, on-site actions must comply only with the substantive portions of a given requirement; on-site activities need not comply with administrative requirements, such as obtaining a permit or record-keeping and reporting. (Monitoring requirements are considered substantive requirements.) **Off-site actions must comply with both substantive and administrative requirements of all applicable laws.** [Note: ARARs are the requirements of environmental and facility siting laws only. Independent of ARARs, on-site activities also must comply with applicable requirements of non-environmental laws (e.g., building codes and safety requirements), excluding permit requirements.]

the basis of geography or their potential threat to public health, welfare, or the environment. In keeping with the statutory criteria under CERCLA Section 121(b), combining facilities as one site for remedial action must also be shown to be cost-effective and not result in any significant additional short-term impacts on public health and the environment. (See preamble to the NCP, 55 FR at 8690-8691; Interim RCRA/CERCLA Guidance on Non-Contiguous Sites and On-Site Management of Waste Residue, OSWER Directive 9347.0-1, March 1986; and 49 FR at 37076, September 21, 1984.)

Q6. Are environmental resource laws, such as the Endangered Species Act, the National Historic Preservation Act (NHPA), and the Wild and Scenic Rivers Act, potential ARARs for CERCLA actions?

A. Yes, requirements in these laws are potential ARARs. However, these laws frequently require consultation with, and under some laws, concurrence of, other Agencies or groups, such as the Fish and Wildlife Service or the Advisory Council on Historic Preservation. Administrative requirements such as consultation or obtaining approval are not required for on-site actions. However, it is strongly recommended that the lead agency nevertheless consult with the administering agencies to ensure compliance with substantive requirements, e.g., the NHPA requirement that actions must avoid or minimize impacts on cultural resources. (See preamble to the NCP, 55 FR at 8757. Also, see Summary of Part II: CAA, TSCA, and Other Statutes, Publication 9234.2-07/FS, April 1990, for further discussion of resource protection laws.)

Q7. Are environmental standards and requirements of Indian Tribes potential ARARs?

A. Yes. Indian Tribal requirements are potential ARARs for CERCLA actions taken on Tribal lands and are treated consistently with State requirements. Tribal requirements that meet the eligibility criteria for State ARARs, i.e., those that are promulgated (legally enforceable and of general applicability), are more stringent than Federal requirements, and are identified in a timely manner, are potential ARARs. (See preamble to the NCP, 55 FR at 8741-8742; section 300.5 of the NCP, 55 FR at 8816 for a definition of Indian Tribe; and the Revised Interim Final Guidance on Indian Involvement in the Superfund Program, OSWER Directive 9375.5-02A, November 28, 1989.)

II. Resource Conservation and Recovery Act (RCRA)

Q8. How can RCRA listed waste be "delisted" when wastes will remain on-site?

A. By documenting in the ROD that the substantive requirements in RCRA for delisting have been met, a RCRA listed waste may be "delisted" when wastes remain on-site.

Once a listed waste is "delisted," it is no longer considered a "hazardous waste" and is, therefore, subject to RCRA Subtitle D requirements for solid waste, rather than the more stringent RCRA Subtitle C requirements.

The substantive requirements that must be met for delisting a RCRA hazardous waste that will remain on-site are the standards in 40 CFR sections 260.22(a)(1) and (2), which state that a waste that "does not meet any of the criteria under which the waste was listed as hazardous or an acutely hazardous waste" and for which there is no "reasonable basis to believe that factors (including other constituents) other than those for which the waste was listed could cause the waste to be a hazardous waste" is "delistable." Administrative requirements, which include requirements to undergo a petition and rulemaking process and to develop and supply specific

information, need not be met on-site. (See A Guide to Delisting of RCRA Wastes for Superfund Remedial Responses, Publication 9347.3-09/FS, September 1990.)

Wastes containing constituents at health-based levels, assuming direct exposure, generally will meet the standards for delisting. Wastes with constituents at higher levels may also be delistable, since the RCRA delisting process allows fate-and-transport modeling, generally based on the waste being managed in a solid waste unit. The models used by the RCRA program for delisting are recommended for use in determining whether constituent concentrations above health-based levels are delistable, e.g., for wastes that will be land disposed (See 50 FR 48886, November 27, 1985 and 51 FR 41082, November 13, 1986). The Waste Identification Branch in the Office of Solid Waste (FTS 382-4770) can also provide assistance and advice in delisting a waste.

Substantive requirements for a waste to meet delisting levels should be documented in the RI/FS and the ROD, and a general discussion of why delisting is warranted should be included (see A Guide to Delisting of RCRA Wastes for Superfund Remedial Responses, Publication 9347.3-09/FS, September 1990). Generally, the constituent levels that must be achieved in order for the waste to be considered non-hazardous should be identified in the ROD. Unless treatability studies done during the RI/FS make delisting reasonably certain, the ROD should also address, as a contingency, how the waste will be handled if it does not achieve delistable levels, based on full-scale treatability studies or actual performance of the remedy during RD/RA. If the waste cannot be delisted, and this contingency is expressly noted in the ROD, a fact sheet may be needed to notify the public that the contingency remedy will be implemented.

Q9. Are RCRA financial responsibility requirements potential ARARs for Superfund?

A. No, because they are considered to be administrative requirements, not substantive environmental requirements. RCRA financial responsibility requirements support implementation of RCRA technical standards by ensuring that RCRA facility owners or operators have the financial resources available to address releases and comply with closure and post-closure requirements. CERCLA agreements with PRPs and, ultimately, the Fund itself, achieve essentially the same purpose.

Q10. RCRA hazardous waste is placed into an existing pit that had received hazardous waste in the past, but is not subject to RCRA Subtitle C regulations because the pit closed before 1980. Would the minimum technology requirements (MTR) be applicable?

A. Yes; although the pit is not considered a "new unit," all surface impoundments (i.e., both new and existing) are subject to MTR if they receive hazardous wastes (i.e., wastes that were hazardous as of November 7, 1984) after November 1988. In addition, the land disposal restrictions (LDRs) prohibit placement of restricted wastes (which are under a national capacity variance) in landfills or surface impoundments that are not in compliance with MTR. If such a waste is placed in the existing waste pit, the pit would have to comply with MTR, even though it is not a "new unit." See Superfund LDR Guide #3: Treatment Standards and Minimum Technology Requirements Under Land Disposal Restrictions (LDRs), Publication 9347.3-03/FS, July 1989.

III. Clean Water Act (CWA) & Safe Drinking Water Act (SDWA)

Q11. Do antidegradation laws for ground water, which are increasingly common in State laws, mean that the aquifer must be restored to its original quality before contamination from the site occurred?

A. In most cases, no. Antidegradation laws are prospective and are intended to prevent further degradation of water quality. At a CERCLA site, therefore, a State ground-water antidegradation law might preclude the injection of partially treated water into a pristine aquifer. It would not, however, require cleanup to the aquifer's original quality prior to contamination. If more stringent State standards than those imposed under Federal law are determined to be ARARs for the site, they would have to be met (e.g., by meeting the discharge requirements) or waived (e.g, by the interim remedy waiver). Where temporary degradation of the ground water may be required during remedial action, protection should be provided by restricting access or providing institutional controls, and EPA response actions should ultimately result in restoration of the ground water's beneficial uses. (See ARARs Q's & A's: State Ground-Water Antidegradation Issues, Publication 9234.2-11/FS, July 1990.)

Q12. There are some situations where an aquifer that is a current or potential drinking-water source, treatable to MCLs at the tap, cannot be remediated to non-zero MCLGs or MCLs in the aquifer. Would non-zero MCLGs or MCLs still be relevant and appropriate?

A. In general, yes. The non-zero MCLGs and, if none, the MCLs, are generally relevant and appropriate for any aquifer that is a potential drinking-water source (see **Highlight 3**) (see section 300.430(e)(2)(i)(B)-(D) of the NCP, 55 FR at 8848). If they cannot be attained (e.g., because of complex hydrogeology due to fractured bedrock), an ARAR waiver for technical impracticability should be used. If attainment of a non-zero MCLG or MCL is impossible because the background level of the chemical subject to CERCLA authority (e.g., a man-made chemical) is higher than that of the MCLG or MCL, attainment of the MCLG or MCL would not be relevant and appropriate. (See CERCLA Compliance With the CWA and SDWA, Publication 9234.2-06/FS, January 1990.)

Highlight 3:
ARARs FOR GROUND-WATER CLEANUP

Non-zero MCLGs, and, if none, MCLs promulgated under SDWA, generally will be the relevant and appropriate standard for ground water that is or may be used for drinking, considering its use, value, and vulnerability as described in the EPA's Ground-Water Protection Strategy (August 1984), e.g., for Class I and II aquifers.

Q13. Many new MCLGs and MCLs will be promulgated or existing ones revised in upcoming years. Will new or revised MCLGs and MCLs, when promulgated, need to be incorporated into the remedy, possibly altering it? Should a proposed non-zero MCLG or MCL be used as the remediation goal in the ROD?

A. Under the NCP, if a new requirement is promulgated after the ROD is signed, and the requirement is determined to be applicable or relevant and appropriate, the remedy should be examined in light of the new requirement (at the 5-year review or earlier) to ensure that the remedy is still protective. If the remedy is still protective, it would not have to be modified, even though it does not meet the new requirement. Since non-zero MCLGs and MCLs often are a key component in defining remediation levels, new or revised MCLGs and MCLs may reveal that the chosen remedy is not protective. In such cases, the remedy would have to be modified accordingly. This could occur at any time after the ROD is signed -- during remedial design, remedial action, or at the 5-year review.

However, a new non-zero MCLG or MCL usually will not mean the remedy must be changed. If the existing remedy is still within the risk range, even considering the new MCLG or MCL, the remedy would not have to be modified because the remedy is still protective. For example, if the new non-zero MCLG or MCL represents a risk of 10^{-6}, while the selected remediation level results in a 10^{-5} risk, the remedy is still considered protective.

At some sites, however, a new MCLG or MCL could require modification to the remedy after implementation of the remedy has begun. Therefore, if a proposed non-zero MCLG or MCL is available before the ROD is signed, the preferred remedy should be evaluated to determine how the MCLG or MCL, if promulgated as proposed, would affect the remedy. Will the preferred remedy achieve the proposed MCLG or MCL? Could the remedy achieve the proposed MCLG or MCL with minor design modifications? Would the proposed MCLG or MCL require significant changes, such as requiring remediation in ground water that is currently deemed fully protective?

The proposed non-zero MCLG or MCL may be used as a "to-be-considered" (TBC) in establishing a protective remediation level in the ROD, provided that: (1) the new standard would make a remedy based on the current standard unprotective; and (2) the proposed standard is not controversial or otherwise is unlikely to change. This reflects the importance of non-zero MCLGs and MCLs in Superfund's determination of protectiveness and as a cleanup standard for the community. It also minimizes the need for later changes to the remedy when changes may be more difficult and costly to make. (See CERCLA Compliance With the CWA and SDWA, Publication 9234.2-06/FS, January 1990.)

Note: In the May 1989 version of this fact sheet, Question 14 addressed the use of the 10^{-6} risk level when non-zero MCLGs or MCLs exist for some, but not all, significant contaminants. Question 14 has been omitted from this fact sheet because this issue is currently being clarified by the Agency. Final resolution of this issue will be addressed in guidance in the near future.

IV. Post-ROD Information and the Administrative Record

Q14. Should remedies be revised to attain requirements of Federal or State environmental law that are promulgated or modified after signature of the ROD?

A. In general, no. The requirements that are determined to be ARARs for a site "freeze" at the time of signature. Requirements that are newly promulgated or modified post-ROD need to be attained (or waived) only when EPA determines that these requirements are ARARs and that they must be met in order for the remedy to be protective (see section 300.430(f)(1)(ii)(B)(1) of the NCP). Newly promulgated or modified requirements will be considered during the five-year review or sooner, if appropriate, to determine whether the remedy is still protective. (See Question 13 of this fact sheet and Question 6 of the fact sheet entitled ARARs Q's & A's: Compliance With the Toxicity Characteristics Rule, Part I, (Publication 9234.2-08/FS, May 1990) for examples of how the "freezing" regulation applies to specific ARARs.)

Q15. What ARARs apply if information not known at the time of ROD signature is discovered post-ROD (e.g., RCRA hazardous wastes are identified on the site for the first time during construction activities)?

A. If, based on the new information, the Region decides to change the remedy (e.g., in order to assure protection), the Region must meet or waive all ARARs identified at that time.

First, Regions must determine whether the new information is such that the ROD should be revised (and an Explanation of Significant Differences (ESD) issued), or amended (and a ROD amendment issued). If the Region believes that significant, but non-fundamental, changes should be made in the selected remedy based on new information (e.g., the discovery of a new contaminant triggers an MCL that is more difficult to meet, resulting in a decision to operate the pump-and-treat system for 15 years instead of 10 years), then an ESD should be issued (see section 300.435(c)(2)(i) of the NCP). If the Region decides to make a fundamental change in the remedy based on the new information (e.g., to change from an engineering control to an incineration remedy), the process for a ROD amendment must be followed (see section 300.435(c)(2)(ii) of the NCP). Regions should include in the administrative record file any documents upon which they base their determinations to issue an ESD or ROD amendment (see section 300.825(a)(2) of the NCP). For additional information on this issue, see Guide to Addressing Pre-ROD and Post-ROD Changes, Publication 9355.3-02FS/4, April 1990.

If, however, the Region decides not to revise or amend the ROD based on the new information, then no new ARARs apply because the remedy is not being changed. To the extent that the Region wishes to document its reasoning on this point (e.g., to explain why the remedy remains protective even taking into account newly-discovered RCRA wastes), this information could be included in the administrative record file. (Note: section 300.825(a)(1) of the NCP allows EPA to add documents to the administrative record file, after ROD signature, that "concern a portion of a response action decision that the decision document does not address or reserves to be decided at a later date.")

Q16. If a ROD does address an action, location, or chemical such that the proper set of ARARs could have been identified prior to the signing of the ROD, but one or more ARARs were not identified, how should the Regions respond if those requirements are identified post-ROD?

A. The selected remedy would generally not be required to meet such late-identified requirements. If the promulgated requirement existed prior to ROD signature, and the waste, action, or location to which the requirement potentially applied was also known at the time of ROD signature, the failure of a party to identify the requirement as an ARAR within the meaning of CERCLA, during the public comment period of the proposed plan, would likely preclude the party from raising the issue after ROD signature.

[Note that section 300.825(c) of the NCP requires EPA to consider comments submitted by interested persons after the close of the comment period only "to the extent that the comments contain significant information not contained elsewhere in the administrative record file which could not have been submitted during the public comment period and which would substantially support the need to significantly alter the response action." This may be a difficult test to meet where information on the requirement was available during the public comment period, and therefore, in most cases, could have been brought to the Agency's attention at that time.]

With regard to State ARARs, CERCLA Section 121(d)(2)(A)(ii) specifically provides that a requirement of a State environmental or facility siting law may be considered to be an ARAR only if it is identified in a timely manner. (Sections

300.400(g)(5), 300.515(d)(1), and 300.515(h)(2) of the NCP indicate that State ARARs identification must take place well before the signature of the ROD in order to be considered "timely.")

EPA could decide to take a newly-identified requirement into consideration on a site-specific basis. However, because no new information on the waste composition or nature of the site is being brought before the Region, it is likely that the risk assessment performed at the site in question will have considered all appropriate risks, and that the site is protective of human health and the environment even in light of the late-identified regulatory standard. In rare cases where the Region evaluates the standard and decides that the remedy should be changed or amended (e.g., based on a finding that the ARAR was incorrectly analyzed and the remedy is not protective), an ESD or ROD amendment should be considered. In such cases any new components of the remedy would be required to attain (or waive) those ARARs identified at the time the ESD or ROD amendment is issued. (Note: the ESD or ROD amendment would be documented in the administrative record file pursuant to section 300.825(a)(2) of the NCP.) If the Region were to decide not to change the remedy, but wanted to memorialize the analysis of the late-identified requirement, an optional Remedial Design Fact Sheet could be added to the post-decision document file. Alternatively, the issue could be addressed in a new comment period and the analysis placed in the administrative record file for the site, as discussed in section 300.825(b) of the NCP.

V. Contingent Waivers

Q17. What are "contingent waivers" and when should they be used?

A. When sufficient information is available at the time of ROD signature indicating the possibility that an ARAR waiver may be invoked at a site (e.g., the RI/FS indicates that it may be technically impracticable to attain non-zero MCLGs or MCLs in the ground water based upon final determinations of the size and scope of the contaminated plume), the lead agency may consider including a contingent waiver in the ROD. RODs with contingent waivers should provide a detailed and objective level or situation at which the waiver would be triggered. In addition, the ROD should specify that the contingency is "reserved to be decided at a later date," so that if the contingency is invoked, the resulting documentation becomes part of the administrative record (see NCP section 300.825(a)(1), 55 FR at 8861). [Note: in some situations, the Agency may not wish to identify a separate trigger for waivers. For example, in some ground-water cleanups, the Agency may wish to retain the flexibility to vary pump rates or assess the effects of temporary shutdown before invoking a technical impracticability waiver.]

The decision to invoke the contingency should be documented in a fact sheet which is placed in the administrative record file. The Region may also decide to issue a public notice (e.g., in a major local newspaper of general circulation) that the contingency has been invoked. An ESD is not required to invoke a contingency specifically contemplated in the ROD. (See Guide to Developing Superfund No Action, Interim Action, and Contingency Remedy RODs, Publication 9355.3-02/FS-3, April 1991, for a general discussion of contingent remedies.)

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NOTICE: The policies set out in this fact sheet are not final Agency action, but are intended solely as guidance. They are not intended, nor can they be relied upon, to create any rights enforceable by any party in litigation with the United States. Response personnel may decide to follow the guidance provided in this fact sheet, or to act at variance with the guidance, based on an analysis of site-specific circumstances. The Agency also reserves the right to change this guidance at any time without public notice.

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CERCLA Compliance With Other Laws Manual
Summary of Part II
CAA, TSCA, and Other Statutes

4

United States Environmental Protection Agency
Office of Solid Waste and Emergency Response
Publication 9234.2-07/FS
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EPA

CERCLA Compliance With Other Laws Manual

Summary of Part II

CAA, TSCA, and Other Statutes

Office of Emergency and Remedial Response
Office of Program Management OS-240
Quick Reference Fact Sheet

Section 121(d) of CERCLA, as amended by the 1986 Superfund Amendments and Reauthorization Act (SARA), requires that remedial actions must at least attain Federal and more stringent State applicable and relevant and appropriate requirements (ARARs) upon completion of the remedial action. The 1990 National Contingency Plan (NCP) requires compliance with ARARs during remedial actions as well as at completion, and compels attainment of ARARs during removal actions whenever practicable. See NCP, 55 Fed. Reg. 8666, 8843 (March 8, 1990) (to be codified at 40 CFR section 300.414(i)), and 55 Fed. Reg. 8666, 8852 (March 8, 1990) (to be codified at 40 CFR 300.435(b)(2)).

To implement the ARARs provision, EPA has developed guidance, CERCLA Compliance With Other Laws Manual: Parts I and II (Publications 9234.1-01 and 9234.1-02). EPA is preparing a series of short fact sheets that summarize these guidance documents. This Fact Sheet focuses on CERCLA compliance with the Clean Air Act, the Toxic Substances Control Act, and the Federal Insecticide, Fungicide, and Rodenticide Act (Chapters 2 and 3 of Part II). In addition, it discusses other statutes that set standards for radioactive wastes, mining wastes, and other resource protection statutes that are potential ARARs for CERCLA actions.

I. STANDARDS FOR AIR

A. CLEAN AIR ACT (CAA)

The objective of the CAA is to protect and enhance the quality of the nation's air resources. The CAA achieves this objective by regulating emissions into the air through National Ambient Air Quality Standards (NAAQS), National Emission Standards for Hazardous Air Pollutants (NESHAPs), and New Source Performance Standards (NSPS). These potential ARARs may apply to both stationary and mobile sources of emissions, and they may be implemented through combined Federal, State, and local programs. See Highlight 1 for CERCLA activities that may trigger CAA ARARs.

1. National Ambient Air Quality Standards (NAAQS)

Under CAA section 109, EPA promulgates NAAQS. NAAQS are national limitations on ambient concentrations intended to protect health and welfare. There are primary and some secondary NAAQS for six pollutants. (See 40 CFR Part 50.) These pollutants (called "criteria pollutants") are: (1) carbon monoxide; (2) lead; (3) nitrogen dioxide; (4) particulate matter equal to or less than 10 microns particle size (PM_{10}); (5) ozone, which results from the emissions of volatile organic compounds (VOCs); and (6) sulfur oxides. Primary standards are set at health-based levels, while secondary standards are designed to protect public welfare and wildlife.

Highlight 1: CERCLA ACTIVITIES POTENTIALLY SUBJECT TO CAA ARARS

- Air stripping (used to volatilize contamination both in ground water and in soil);
- Thermal destruction (e.g., incineration);
- Handling of contaminated soil, including loading, unloading, compacting material in a landfill, and digging;
- Gaseous waste treatment (e.g., flaring used when capping and venting a site, usually at abandoned or inactive landfills); and
- Biodegradation (especially when aeration of liquids is involved).

NAAQS are not applicable to source-specific emissions limitations, nor enforceable in and of themselves. States translate them into source-specific emission limitations through State Implementation Plans (SIPs). The CAA requires each State to adopt and submit to EPA for approval a SIP for implementing and enforcing NAAQS. Upon EPA approval, the SIP becomes both Federally enforceable and a potential Federal ARAR at a site. The SIP may contain State, regional, or local air program requirements, or the State may adopt more stringent standards than those found in the SIP. Both State requirements approved through the SIP process and more stringent State standards issued under State law are potential ARARs for Superfund sites.

In addition to requirements established in SIPs for implementing NAAQS, there are regulatory requirements for "major sources" of emissions. The requirements vary depending upon whether the area in which the source is located is an attainment or a non-attainment area. Attainment areas are those regions of the country that are designated as being in compliance with the NAAQS for criteria pollutants (see 40 CFR Part 81). Non-attainment areas are those parts of the country where compliance has not been attained for one or several criteria pollutants. Therefore, a certain area may be designated as an attainment area for one, and a non-attainment area for another, of the criteria pollutants. RPMs should contact EPA Regional Air Branch Chiefs or their Air/Superfund Coordinators for additional questions concerning attainment and non-attainment areas.

In general, emissions from CERCLA activities are not expected to qualify as "major;" therefore, these requirements are not likely to be applicable to CERCLA response actions. **Highlight 2** summarizes these requirements for major sources in attainment and non-attainment areas.

For a site where a ground-water pump-and-treat technique or soil vapor extraction is used together with air strippers in an ozone non-attainment area, the June 15, 1989 memorandum entitled, "Control of Air Emissions from Superfund Air Strippers at Superfund Groundwater Sites" (OSWER Directive 9355.0-28), **is an important to-be-considered (TBC)**. The guidance indicates that sources that need controls are those with actual emissions rates in excess of 3 lbs/hr, or 15 lbs/day, or a calculated rate of 10 tons/year (T/yr) of total VOCs.

Highlight 2: REQUIREMENTS FOR MAJOR SOURCES IN ATTAINMENT AND NON-ATTAINMENT AREAS

Attainment Areas and Areas Defined as Unclassified

- **Requirement:** Prevention of Significant Deterioration (PSD) regulations, found at 40 CFR Part 52, require that affected sources meet an emission limit that reflects the installation and operation of Best Available Control Technology (BACT). PSD permit regulations also require that the source meet specified air quality deterioration increments.
- **Applicable To:** New stationary major source of emissions and major modification to existing source in an attainment or unclassified area.
- **Definition of Major Source:** Either emits 250 or more T/yr of any regulated pollutant, or the site has a facility such as an incinerator or chemical processing plant that emits 100 or more T/yr.

Non-attainment Areas

- **Requirement:** Must meet Lowest Achievable Emission Rate (LAER). Additionally, the SIP must contain a growth allowance or the operator of the source must provide an emissions offset.
- **Applicable To:** Anything that falls within the definition of a major source for non-attainment areas (not source-specific).
- **Definition of Major Source:** Emissions of 100 or more T/yr of the pollutant designated as non-attainment in that area.

2. National Emissions Standards for Hazardous Air Pollutants (NESHAPs)

Hazardous air pollutants are those pollutants for which no ambient air quality standard exists, but which cause, or contribute to, air pollution that may reasonably be anticipated to result in an increase in mortality or an increase in serious irreversible illness. The CAA requires EPA to list periodically the hazardous air pollutants it intends to regulate, and to establish emission standards (NESHAPs) for them. NESHAPs are listed at 40 CFR Part 61.

NESHAPs have been promulgated for emissions of particular air pollutants from specific sources. NESHAPs are not generally applicable to Superfund response actions because CERCLA sites do not usually contain one of the specific source categories regulated. More-

over, NESHAPs are generally not relevant and appropriate because the standards are intended for the specific sources regulated and their use will generally not be well-suited for all sources of that pollutant. As a possible exception, the NESHAPs for asbestos and radionuclides may be ARARs for a CERCLA site (see **Highlight 3**).

3. New Source Performance Standards (NSPS)

The CAA requires EPA to promulgate NSPS for new stationary sources that emit particular pollutants that cause or significantly contribute to air pollution. Since NSPS are source-specific requirements, they are not applicable to Superfund response actions unless they include a "new source" subject to NSPS, such as a municipal waste combustor. If the response action does not include a source subject to NSPS, NSPS may be relevant and appropriate if the pollutant emitted and the technology employed at the site are sufficiently similar to the pollutant and source category regulated by an NSPS, so that their use is well-suited to site circumstances. For example, if cleanup involves incineration at a municipal landfill, the NSPS for particulate emissions from incinerators with a charging rate of 50 T/day, which are used for burning solid waste containing more than 50 percent municipal-type waste, may be a potential ARAR.

B. RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) AIR EMISSION REGULATIONS

There are RCRA regulations covering hazardous waste air emissions from incinerators, land disposal facilities, and other treatment, storage, and disposal facilities (TSDFs). The potential ARARs for incinerators consist of standards for destruction and removal efficiency, for products of incomplete combustion, metals, and emissions of hydrogen chloride, and for particulates. Potential ARARs for land disposal facilities are limited to the requirement that particulate matter from such facilities be controlled by covers or other means. Potential ARARs for TSDFs include air emission standards for process vents and equipment leaks, and air emission standards for container storage, tanks, surface impoundments, and waste fixation units (see 40 CFR Parts 264 and 269).

C. STATE AIR TOXIC PROGRAMS

Several State air pollution control agencies have adopted programs to regulate "toxic air pollutants." These requirements are likely to be the most significant air emission ARARs at Superfund sites. Different States have regulations for different pollutants and have adopted differing levels of safety. RPMs should coordinate with the appropriate State agency and their own Regional Air/Superfund Coordinator to determine what potential ARARs (if any) the pertinent State Air Toxic Program contains.

Highlight 3: POTENTIAL NESHAP ARARs

POTENTIAL ASBESTOS NESHAP ARARs

- 40 CFR section 61.147 establishes procedures for asbestos emission control during demolition of buildings or equipment containing friable asbestos material. This regulation may be an ARAR for a response action that includes demolishing a building containing asbestos.

- 40 CFR section 61.153 sets standards for inactive waste disposal sites from asbestos mills and manufacturing and fabricating operations; 40 CFR section 61.156 establishes standards for active waste disposal sites; and 40 CFR section 61.152 establishes standards for disposal of asbestos containing waste from demolition and renovation operations. These standards may be ARARs for response actions involving asbestos disposal.

POTENTIAL RADIONUCLIDE NESHAP ARARs

- 40 CFR Part 61, Subparts H and I are applicable to airborne emissions of radionuclides (excluding radon-220 and 222 for Subpart H and radon-222 for Subpart I) from incinerators, land disposal facilities, and other TSDFs for radioactive materials, during the cleanup of sites at Department of Energy (DOE) facilities, Nuclear Regulatory Commission-licensed facilities, and non-DOE Federal facilities, such as Department of Defense facilities.

- 40 CFR Part 61, Subpart T applies to radon-222 emissions from the disposal of uranium mill tailings; Subpart W applies to uranium mill tailings piles during operation; Subpart R applies to radon-222 emissions from phosphogypsum stacks (piles) after disposal; and Subpart Q applies to radon-222 emissions from storage and disposal facilities for radium-containing material that are owned or operated by DOE (see NCP, 54 Fed. Reg. 51654 (December 15, 1989) for Subparts T, Q, and R). These subparts may be ARARs if the response action occurs at an underground uranium mine or at a uranium mill site. They may be potential ARARs for other CERCLA sites (especially mining sites).

II. STANDARDS FOR TOXICS AND PESTICIDES

A. TOXIC SUBSTANCES CONTROL ACT (TSCA)

TSCA authorizes EPA to establish testing, premanufacture notification, control, and recordkeeping regulations pertaining to toxic chemical substances. Those requirements that regulate control of polychlorinated biphenyls (PCBs), fully halogenated chlorofluoroalkanes, and asbestos are potential ARARs for CERCLA response actions. In addition, EPA generates risk numbers for chemicals to be studied under TSCA. These risk numbers for particular chemicals may constitute guidelines that are TBC, and may be consulted when developing a protective remedy.

1. PCB Disposal Requirements

PCB disposal requirements under TSCA will be applicable if disposal of material contaminated with PCBs at concentrations of 50 ppm or greater occurred after February 17, 1978. (These requirements may be relevant and appropriate if disposal occurred before that date.) TSCA requirements for disposal of PCB-contaminated wastes vary according to the physical state of the PCBs (liquid, non-liquid, or articles), and PCB concentration. See the CERCLA Compliance with Other Laws Manual, Part II, Chapter 3 (pp. 3-2 through 3-5) for a complete list of potential TSCA ARARs for PCBs. The Office of Emergency and Remedial Response is finalizing a Guidance on Remedial Actions for Superfund Sites with PCB Contamination (OSWER Directive 9355.4-01) that discusses the circumstances under which the PCB antidilution requirements may apply at CERCLA sites.

2. PCB Storage Requirements

The substantive portions of the PCB storage requirements found at 40 CFR section 761.65 may be ARARs for the storage of PCBs prior to disposal. Other potential ARARs include requirements for PCB storage facilities and containers.

3. PCB Spill Cleanup Policy

EPA has published a nationwide TSCA PCB spill cleanup policy in 40 CFR Part 61, Subpart G. The action-specific and cleanup guidelines contained within this policy are potential TBCs, especially with respect to the cleanup of PCB-contaminated soils. The spill policy is effective for PCB spills occurring after May 4, 1987.

B. RCRA LAND DISPOSAL RESTRICTIONS (LDRs) FOR PCBs

The land disposal of liquid RCRA hazardous wastes that contain PCBs at concentrations equal to or greater than 50 ppm, are regulated by RCRA under the California List Wastes LDRs, promulgated on July 8, 1987 (see **Highlight 4**). RCRA LDRs for PCBs may be ARARs when the response action involves excavating, dredging, or other measures that move PCB-contaminated materials into a land-based unit.

Highlight 4: RCRA LDR REQUIREMENTS FOR PCBs

- Liquid RCRA hazardous wastes containing PCBs at concentrations between 50 and 499 ppm must be incinerated (or treated by an equivalent method) in a facility that meets the requirements of 40 CFR section 761.70, or burned in a high efficiency boiler meeting the requirements of 40 CFR section 761.60. See 40 CFR section 268.42(a)(1).
- Liquid RCRA hazardous wastes containing PCBs at concentrations equal to or greater than 500 ppm must be incinerated consistent with the technical requirements of 40 CFR section 761.70 or be treated by an equivalent method. See 40 CFR section 268.42(a)(1).
- Nonliquid and liquid RCRA hazardous wastes containing PCBs and halogenated organic compounds (HOCs) must be incinerated consistent with the requirements of Part 264, Subpart O, or Part 265, Subpart O, if the total concentration of HOCs is equal to or greater than 1,000 mg/kg. In the proposed third thirds rule under RCRA, EPA is proposing to revoke the California List provision allowing burning of HOCs in furnaces and boilers (see 54 Fed. Reg. 48499 (November 22, 1989)). This rule will not affect the PCB regulations mentioned above.

C. FEDERAL INSECTICIDE, FUNGICIDE, AND RODENTICIDE ACT (FIFRA)

FIFRA authorizes EPA to regulate the sale, distribution, and use of all pesticide products in the United States through product licensing or registration. Under FIFRA, use of a product in a manner inconsistent with its labeling is a violation of the Act. However, compliance with FIFRA by following labeling directions may not be required at a Superfund site since the pesticide may be a RCRA waste at that point.

TBCs under FIFRA include nonbinding "procedures not recommended" for disposal of pesticides (see 40 CFR section 165.7) and nonbinding "recommended procedures" for disposal of pesticides (see 40 CFR section 165.8). In addition to disposal TBCs, there are tolerance levels for pesticides and pesticide residuals in or on raw agricultural commodities. These tolerance levels are potential ARARs where sites have agricultural commodities or wildlife for consumption.

Discharges of pesticides to surface waters through a point source are subject to effluent limitations as toxic pollutants under the Clean Water Act (CWA). The CWA requirements are, therefore, potential ARARs for such discharges. In addition, discarded or off-specification pesticides may be regulated under RCRA Subtitle C as listed or characteristic hazardous wastes. Thus, RCRA Subtitle C requirements are potential ARARs for such pesticides.

III. STANDARDS FOR RADIOACTIVE WASTES

There are few standards applicable to the cleanup of radioactively contaminated sites and buildings, except for standards for mill tailings under the Uranium Mill Tailings Radiation Control Act and EPA's standards (when promulgated) for residual radioactivity for cleanup of a site where radionuclides have been used. Other standards for radioactive waste may be relevant and appropriate when determined to be well-suited for cleanup of a specific site. When reviewing potential ARARs, it is important to determine under which Agency's regulatory jurisdiction a site falls, in order to help determine applicability.

A. POTENTIAL EPA ARARs FOR RADIOACTIVE WASTE

Under the CAA, EPA has promulgated radionuclide NESHAPs for five different source categories. Subparts H and I, which address DOE, Nuclear Regulatory Commission (NRC)-licensed, and non-DOE Federal facilities, are most likely to be potential ARARs for CERCLA response actions (see 40 CFR Part 61). Under the Safe Drinking Water Act, EPA has promulgated maximum contaminant levels (MCLs) for radionuclides in two forms: (1) radioactivity concentration limits for certain alpha-emitting radionuclides; and (2) an annual dose limit for the ingestion of certain beta/gamma-emitting radionuclides (see 40 CFR Part 141). Since the radionuclides MCLGs equal zero, the MCLs are potential ARARs for Superfund sites. Under the Atomic Energy Act, there are environmental protection standards that set limits on radiation doses received by members of the general public from operations within the uranium fuel cycle of nuclear generators. While these standards are not applicable because they apply to normal operations and planned discharges, they may be relevant and appropriate to releases of radionuclides and radiation during cleanup of radioactively contaminated sites (see 40 CFR Part 190). Under the Uranium Mill Tailings Radiation Control Act, EPA has set standards for mill tailings at two types of sites: (1) certain inactive uranium processing sites "designated" for remedial action under section 102 of the Uranium Mill Act; and (2) commercial uranium and thorium processing sites licensed by the NRC or States (see 40 CFR Part 192). EPA has also established surface-water discharge standards for radionuclides. These standards are applicable to discharges from certain kinds of mines and mills; they may be relevant and appropriate to response actions involving discharges of radionuclides to surface waters from other types of sites (see 40 CFR Part 440).

B. POTENTIAL NRC ARARs FOR RADIOACTIVE WASTE

Standards found in 10 CFR Part 20 may be applicable to CERCLA actions at NRC-licensed facilities; they may be relevant and appropriate to CERCLA actions at radioactively contaminated sites not licensed by the NRC. These standards establish permissible levels of radiation in unrestricted areas, concentration limits for discharges to unrestricted areas, and waste disposal requirements.

Standards found in 10 CFR Part 61 establish criteria applicable to existing licensed low-level waste disposal sites. These criteria are not applicable to previously closed sites such as existing CERCLA sites. However, the technical requirements may be relevant and appropriate to CERCLA sites with low-level radioactive waste, if the waste will be permanently left on site.

Standards found in 10 CFR Parts 30, 40, and 70 contain licensing requirements for the possession and use of byproduct, source, and special nuclear material, respectively. Any substantive requirements found within these standards may be applicable to response actions at sites licensed under these NRC regulations. They may be relevant and appropriate to other, non-licensed sites that contain radioactive contamination.

C. POTENTIAL DOE ARARs FOR RADIOACTIVE WASTE

Most of DOE's operations are exempt from NRC's licensing and regulatory requirements. DOE's requirements for radiation protection and radioactive waste management are found in internal DOE orders. These

orders have the same force for DOE facilities as does a regulation; however, because they are not promulgated requirements, they are not potential ARARs. The requirements in the orders are applicable only to DOE installations and do not apply to sites outside of DOE's jurisdiction.

Because DOE's orders typically incorporate requirements promulgated by other Federal agencies, they should be consistent with existing regulations. To the extent that they are more stringent or cover issues not addressed by existing ARARs, they may be TBCs at a site. The most important DOE orders concerning radiation protection and radioactive waste management are DOE 5400.5, "Radiation Protection of the Public and the Environment," and DOE 5820.2A, "Radioactive Waste Management."

IV. STANDARDS FOR MINING WASTES

Potential ARARs under the Uranium Mill Tailings Radiation Control Act are discussed in the preceding section. Other potential ARARs for mining wastes are found in the Surface Mining Control and Reclamation Act and in the Resource Conservation and Recovery Act.

A. SURFACE MINING CONTROL AND RECLAMATION ACT (SMCRA)

Requirements under SMCRA may be applicable to response actions associated with abandoned coal mines (see 30 CFR Part 816). **Highlight 5** illustrates when requirements in 30 CFR Part 816 may be relevant and appropriate for response actions at other types of mining sites.

Highlight 5: POTENTIAL MINING WASTE ARARS

- Where a site contains geologic materials containing sulfides, there may be a release or threat of a release of acid. Such a release could mobilize a related release of acid-soluble metals that are hazardous substances, thus adversely affecting aquatic and other resources. 30 CFR Part 816.4 requirements that boreholes and shafts be sealed to prevent drainage from or into ground water may be relevant and appropriate to such a site.

- Where a site is subject to erosion, it is vulnerable to releases of wastes that are contaminated by heavy metals. Revegetation requirements found in 30 CFR section 816.111 may be relevant and appropriate to protect a cap at a CERCLA mining site from erosion and to prevent further releases of arsenic or heavy metals.

B. RCRA STANDARDS

RCRA section 3001(b) (known as the Bevill Amendment) temporarily prohibited EPA from regulating, as hazardous waste, the solid waste from the extraction and processing of ores and minerals, pending further study and regulation by the Agency. Therefore, Subtitle C requirements were not applicable to mining wastes, nor to soil and debris wastes contaminated with mining wastes (since the contamination does not derive from a RCRA hazardous waste) until EPA made a regulatory determination to remove a certain mining waste or waste stream from the Bevill Amendment exclusion. The Bevill Amendment exempted these wastes from Subtitle C requirements even if a waste would otherwise be considered a characteristic hazardous waste. However, the mining wastes may come within the CERCLA definition of hazardous substances, even if they do not contain RCRA hazardous wastes.

EPA has retained 20 mineral processing wastes as "special wastes" (i.e., high volume/low toxicity wastes) under the Bevill Amendment exclusion, which are therefore exempt from Subtitle C requirements until a final regulatory determination is made of their status in January, 1991 (see 54 Fed. Reg. 36592 (September 1, 1989) and 55 Fed. Reg. 2322 (January 23, 1990)). All of the mineral processing wastes that were permanently removed by EPA from the Bevill Amendment exclusion (i.e., any mineral processing waste other than the above-referenced 20) are subject to RCRA Subtitle C regulation if they are solid wastes and exhibit one or more of the characteristics of hazardous waste, or are otherwise listed as hazardous wastes (see 55 Fed. Reg. 2322, 2323 (January 23, 1990.)) EPA has listed the following six smelting wastes as RCRA hazardous wastes: KO64, KO65, KO66, KO88, KO90 and KO91. Therefore, RCRA Subtitle C requirements are potential ARARs for sites containing these wastes (see 53 Fed. Reg. 35412 (September 13, 1988)).

Whether RCRA Subtitle C requirements are relevant and appropriate for mineral processing wastes that are within the Bevill Amendment exclusion should be determined on a site-specific basis. However, RCRA Subtitle C requirements are not expected to be relevant and appropriate for most of the exempted wastes because many of the same factors that justified an exemption are used to determine relevance and appropriateness (see NCP, 55 Fed. Reg. 8666, 8763 (March 8, 1990)).

Mining wastes that are not currently regulated under Subtitle C may be subject to Subtitle D requirements. Subtitle D provides performance standards used by States to set standards acceptable for solid waste facilities and management practices. The Agency is developing regulations under Subtitle D specifically for those mining wastes that are not to be regulated as hazardous waste. When promulgated, these regulations may be ARARs for sites where those mining wastes are present.

V. OTHER RESOURCE PROTECTION STATUTES

The resource protection laws discussed in this section contain some substantive requirements which may be ARARs, but the majority of their requirements are administrative, such as consultation and reporting requirements. Unlike off-site CERCLA response actions, on-site CERCLA investigative and response actions are not required to meet administrative requirements (see NCP, 55 Fed. Reg. 8666, 8756 (March 8, 1990)). However, the lead agency should consider consulting with relevant Federal, State, and local agencies to take advantage of their expertise, when an issue arises that is under their jurisdiction (see NCP, 55 Fed. Reg. 8666, 8757 (March 8, 1990)). Consultation is most advantageous when initiated early in the process, such as during the preliminary assessment or site investigation.

A. NATIONAL HISTORIC PRESERVATION ACT (NHPA)

Pursuant to sections 106 and 110(f) of NHPA, the lead agency is required to take into account the effects of CERCLA response actions on any historic properties included on, or eligible for inclusion on the National Register of Historic Places. The National Register lists historic properties (known as "cultural resources"), which consist of districts, sites, buildings, structures, and objects that are significant in American history or culture for their architectural, archeological, engineering, or other aspects. For instance, the substantive requirement to avoid adverse effects on cultural resources, found in 36 CFR section 800.5(e), is a potential ARAR.

To comply with potential NHPA ARARs, the lead agency should initially determine whether there are any possible historic properties located on or near the site, or within or near the area under study in the remedial investigation. For example, many CERCLA sites could contain remains of archeological significance, such as American Indian artifacts. If such a possibility seems likely, the lead agency should first contact the Department of the Interior (DOI), which maintains the National Register. Single copies of the National Register are available from: National Register, U.S. Department of the Interior, Washington, DC 20240. Annual updates of new National Register listings are published in the Federal Register each February or March. The Federal Register will also list properties already determined by the Secretary of Interior to be eligible for the National Register. Finally, information on National Register listings may also be obtained from the State Historic Preservation Officers (SHPOs), who are appointed by their respective governors.

If the site or any portion of the site has not been determined by the DOI to be eligible for inclusion on the National Register, the lead agency should make such a determination. The regulations at 36 CFR section 60.4 establish the criteria used to determine whether properties qualify for inclusion on the National Register. These criteria are applied to properties through a "cultural resource survey" (CRS). Most of the information needed to complete the CRS will be developed during the RI/FS. When cultural resources are identified, the lead agency evaluates and considers any effects upon cultural resources as part of its review of alternatives during the RI/FS, in order to avoid or minimize adverse effects on these resources. See the CERCLA Compliance with Other Laws Manual, Part II, Chapter 4 (pp. 4-6 through 4-10) for further detailed discussion. Consultation procedures between EPA, the Advisory Council, and SHPOs are being formalized in a Programmatic Memorandum of Agreement (in draft at the time of this printing).

B. ENDANGERED SPECIES ACT (ESA)

Section 7(a) of the ESA requires Federal agencies to consult with DOI and the National Oceanic and Atmospheric Administration (NOAA), as appropriate, to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species, or adversely modify or destroy their critical habitats. Actions that might jeopardize species include direct and indirect effects, as well as the cumulative effects of other actions, whether interdependent, interrelated, or located on another nearby hazardous waste cleanup site.

Substantive ARARs under the ESA consist of the requirements that the lead agency determine whether a threatened or endangered species, or its critical habitat, will be affected by a proposed response action. This is accomplished through the performance of a biological assessment. If such a determination is made that a threatened species or habitat will be affected by the planned action, the lead agency must avoid the action or take appropriate mitigation measures. If at any point the conclusion is reached that endangered species are not present or will not be affected, no further analysis or action would be required in order to comply with ESA.

To determine whether the project is likely to jeopardize the continue existence of any endangered or threatened species or result in the destruction or adverse modification of a critical habitat, the lead agency should consult with the U.S. Fish and Wildlife Service (FWS) for terrestrial and freshwater species and NOAA for marine species. EPA (Office of Solid Waste and Emergency Response), FWS, and NOAA are planning to formalize consultation procedures for both removal actions and on-site remedial actions in a Memorandum of Understanding (in draft at the time of this printing).

C. WILD AND SCENIC RIVERS ACT (WSRA)

The WSRA establishes requirements that apply to water resource projects affecting wild, scenic, or recreational rivers within the National Wild and Scenic Rivers System, as well as rivers designated on the National Rivers Inventory to be studied for inclusion in the National System. For purposes of the Act, a project is a dam, water conduit, reservoir, powerhouse, transmission line, discharge to waters, or other water resources project that would affect the free-flowing characteristics of the water. If a response action could affect the free-flowing characteristics of such a river, the requirement that such action should minimize adverse impacts may be a potential ARAR. Response alternatives should be developed in consultation with DOI (National Park Service) and the Department of Agriculture.

D. FISH AND WILDLIFE COORDINATION ACT (FWCA)

The FWCA protects fish and wildlife through the review of actions that control or structurally modify a natural stream or body of water. A potential ARAR under the FWCA is the requirement to consider the effect that such water-related projects would have upon fish and wildlife, and take action to prevent loss or damage to these resources. While consultation with FWS or NOAA is required under CERCLA only if alteration of the water resource would occur from off-site activities (e.g., a change in the rate of flow), consultation is strongly recommended for on-site activities as well.

E. COASTAL ZONE MANAGEMENT ACT (CZMA)

The CZMA regulates actions by Federal agencies that directly affect the coastal zone. The Act requires Federal agencies to conduct or support their activities in a manner consistent with approved State coastal zone management programs (CZMPs). The requirement to determine whether a response action will have any effect (whether adverse or not) on the coastal zone of a State with an approved CZMP is a potential ARAR. Specifically, the lead agency is required to determine whether the activity will be consistent, to the maximum extent practicable, with the State's CZMP. The lead agency should notify the State of its determination. Copies of a State's CZMP may be obtained from the State's coastal commission. All coastal States have approved CZMPs except for Georgia, Texas, Ohio, Indiana, Illinois, and Minnesota. For off-site actions that require a Federal permit, the State must certify that the proposed activity complies with its coastal zone management plan (see CZMA section 307(c)(3)).

F. WILDERNESS ACT (WA)

The WA administers wilderness areas to preserve their character and to keep them unimpaired for future use as wilderness. To comply with ARARs under the WA, the RPM must first identify whether the response action would affect designated wilderness areas (see 16 USC section 1132). The Regional NEPA Compliance Staff should be able to identify these areas. If a potential impact is anticipated, the RPM should determine whether any prohibitions apply to the proposed response action. To take advantage of their expertise, the RPM should consult with the NEPA Compliance Staff and the administering agency to make this determination. The RPM should then determine whether an exemption is necessary under the WA or CERCLA.

G. NATIONAL ENVIRONMENTAL POLICY ACT (NEPA)

Like the NEPA regulations, the RI/FS and remedy selection process under CERCLA provide for consideration of the potential impacts of CERCLA response actions on the environment, and provide for significant public participation. EPA response actions are not required to follow procedures in addition to those in the NCP in order to comply with NEPA.

ARARs Q's and A's:
Fund Balancing Waiver

5

United States Environmental Protection Agency

Office of Solid Waste and Emergency Response

Publication 9234.2-13/FS

January 1991

EPA

ARARs Q's & A's:
The Fund-Balancing Waiver

Office of Emergency and Remedial Response
Office of Program Management OS-240

Quick Reference Fact Sheet

Section 121(d) of CERCLA, as amended by the 1986 Superfund Amendments and Reauthorization Act (SARA), requires that on-site remedial actions must attain (or waive) Federal and more stringent State applicable or relevant and appropriate requirements (ARARs) of environmental laws upon completion of the remedial action. The revised National Contingency Plan of 1990 (NCP) requires compliance with ARARs during remedial actions as well as at completion, and compels attainment of ARARs during removal actions to the extent practicable, considering the exigencies of the situation. See NCP, 40 CFR section 300.415(i) (55 FR 8666, 8843) and section 300.435(b)(2) (55 FR 8666, 8852) (March 8, 1990).

To implement the ARARs provisions, EPA has developed guidance, CERCLA Compliance With Other Laws Manual: Parts I and II (Publications 9234.1-01 and 9234.1-02), and has provided training to Regions and States on the identification of and compliance with ARARs. These "ARARs Q's and A's" are part of a series of Fact Sheets that provide guidance on a number of questions that arose in developing ARARs policies, in ARARs training sessions, and in identifying and complying with ARARs at specific sites. This particular Q's and A's Fact Sheet addresses the Fund-balancing waiver, which is one of six statutory waivers that may be invoked to allow the selection of a remedy that does not meet all ARARs.

Q1. What is the Fund-balancing waiver? How does it work?

A: The Fund-balancing waiver is one of the six statutory waivers that may be invoked under specified circumstances to allow selection of a remedy that does not meet all ARARs (see CERCLA Section 121(d)(4)(F)). A waiver based on Fund balancing first appeared in the 1985 NCP at 40 CFR section 300.68(i)(5)(ii). The concept of a Fund-balancing waiver was codified by the Superfund Amendments and Reauthorization Act of 1986 (SARA), which amended the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) (see **Highlight 1** for specific statutory language and citation).

The Fund-balancing waiver may apply when the costs needed to meet an ARAR for an action would be so high as to threaten the availability of Fund monies for remedies at other sites (see Preamble to the NCP, 55 FR 8666, 8750). **Highlight 2** provides an example of the Fund-balancing waiver. The waiver applies only to Fund-financed remedial actions under CERCLA Section 104. Even when the waiver is invoked, the alternative remedy selected must still be protective of human health and the environment and meet all other standards (e.g., cost-effectiveness, permanent solutions, etc.). (See Preamble to the NCP, 55 FR 8666, 8750.) Regions should consult with Headquarters when considering use of this waiver.

Q2. What is the purpose of the Fund-balancing waiver?

A: The purpose of this waiver is to ensure that EPA's ability to carry out a comprehensive national response program is not compromised by a disproportionately high expenditure at a single Superfund site.

Highlight 1: STATUTORY LANGUAGE

Section 121(d)(4)(F) of CERCLA, as amended, states that a remedial action not meeting an ARAR may be selected if:

> "in the case of a remedial action to be undertaken solely under Section 104 using the Fund, selection of a remedial action that attains such level or standard of control will not provide a balance between the need for protection of public health and welfare and the environment at the facility under consideration, and the availability of amounts from the Fund to respond to other sites which present or may present a threat to public health or welfare or the environment, taking into consideration the relative immediacy of such threats."

Highlight 2: EXAMPLE OF THE FUND-BALANCING WAIVER

At site X, a State water-quality standard was identified as an ARAR. Attaining this State standard would have required the removal and off-site disposal of millions of cubic yards of contaminated sediments in the streams and reservoir, at an estimated cost of more than $1 billion. The cost of attaining the ARAR exceeds the threshold of four times the cost of a typical operable unit, and thus, the Fund-balancing waiver was considered. Based on an assessment of the Fund, and needs at other sites, the Agency decided to invoke the waiver. The waiver allowed selection of an alternative remedy that involved partial capping and surface-water diversion at a fraction of the original cost, while still achieving protectiveness and complying with other ARARs.

Q3. When should the Fund-balancing waiver be considered? Is there an absolute threshold for invoking the waiver?

A. The Fund-balancing waiver is to be routinely considered when the cost of meeting an ARAR for an operable unit is four times the national average cost of remediation of all operable units. (See Preamble to the NCP, 55 FR 8666, 8750.) However, there is no set amount at which the waiver must be invoked.

Currently the threshold for considering the waiver is 4 x $14.4 million, or $57.6 million. This average cost for an operable unit is based on the Outyear Liability Model (OLM), which is EPA's approach to estimating its long-term resource needs. The average cost figure was developed through an analysis of nearly 200 Records of Decision (RODs) that have been signed since the passage of SARA (i.e., FY 1987 to present). As a group, this body of documents is the most comprehensive and representative source of remedial action cost estimates available within the Agency. The OLM average cost of an operable unit is reported in the FY 1989 Superfund Annual Report to Congress. (Revisions will be reported in subsequent Annual Reports and also made available to Regions through subsequent fact sheets.)

Q4. Does the waiver have to be invoked when the costs of meeting an ARAR are estimated to exceed the dollar threshold?

A. No. Exceeding the threshold establishes a presumption that the waiver should be considered, but does not require that it be invoked. In instances where the threshold is reached but the Fund-balancing waiver is not invoked, either the ROD or the Administrative Record should document the fact that the waiver was considered and provide the rationale. For example, the Region might determine that the cost of performing this remedy is not so disproportionately high as to threaten the availability of the Fund to respond to other sites that may present a threat to human health and the environment.

Q5. Can the Fund-balancing waiver be invoked even when the cost threshold is not exceeded?

A. Yes. EPA has reserved the right to invoke this waiver in specific situations when the cost of meeting the ARAR is expected to fall below the threshold but EPA has determined that the single site expenditure would place a disproportionate burden on the Fund. (See Preamble to the NCP, 55 FR 8666, 8750.)

Q6. Is the waiver available for other Federal agencies or potentially responsible parties (PRPs)?

A. No. CERCLA Section 121(d)(4)(F) clearly restricts use of this waiver to remedial actions conducted under CERCLA Section 104 and financed by the Fund. The waiver is unavailable to other Federal agencies or PRPs, which use other monies for their CERCLA activities. (See also Preamble to the NCP, 55 FR 8666, 8750.)

Q7. Most remedies have to comply with more than one ARAR. If the Fund-balancing waiver is being considered, which ARAR should be waived?

A. The ARAR that increases the potential remedial action costs by the threshold amount should be considered for the Fund-balancing waiver. However, the remedial action must comply with other ARARs that do not excessively raise the cost of remediation.

Q8. Can the Fund-balancing waiver be used with other waivers?

A. Yes. For example, the Fund-balancing waiver could be used to waive an excessively expensive ARAR at the same site where it is necessary to waive another ARAR because of technical impracticability.

Q9. Can the Fund-balancing waiver be used for removal actions?

A. In theory, yes, but this is highly unlikely given the monetary limits and limited scope of removal actions. It is more likely that compliance with an excessively expensive ARAR for a removal action would be determined to be beyond the scope of the action, and therefore impracticable under the NCP. (See NCP at 40 CFR section 300.415(i)(2) and Preamble to the NCP, 55 FR 8666, 8696.)

Q10. Can the Fund-balancing waiver be invoked only at Fund-lead orphan sites (i.e., sites where no PRPs have been identified)?

A. No. The Fund-balancing waiver may also be invoked at a Fund-lead site where PRPs exist and may potentially settle. However, if PRPs do settle and subsequently take over the project, they cannot take advantage of the waiver -- the action will no longer be solely funded under Section 104 and the Fund-balancing waiver will no longer be available. Likewise, the waiver is not available for mixed-funding cases involving contributions by both PRPs and the Fund. Therefore, where circumstances for settlement with PRPs potentially exist, the Region should anticipate this possibility by including a contingent remedy (without the waiver) in the ROD. If such a contingent remedy has not been included in the ROD, and a settlement with PRPs is reached, the ROD should be amended to remove the waiver or an Explanation of Significant Differences (ESD) should be issued. The ROD should be amended if removing the waiver would fundamentally alter the basic features of the selected remedy. (See NCP at 40 CFR section 300.435 (c)(2)(ii) and Preamble to the NCP, 55 FR 8666, 8771-8772.) An ESD may be issued if removing the waiver significantly changes, but does not fundamentally alter, the remedy selected in the ROD. (See NCP at 40 CFR section 300.435(c)(2)(i) and Preamble to the NCP, 55 FR 8666, 8770-8772.)

Q11. If the Fund-balancing waiver has not been invoked in the ROD because a PRP settlement was anticipated, can it be subsequently invoked if no settlement ever occurs?

A. Yes. If a settlement with PRPs is not reached, and the remedy will be performed using Fund monies under CERCLA Section 104, the Fund-balancing waiver can be invoked by a ROD amendment or, in appropriate cases, an ESD.

Q12. Will the answer to the previous questions ever lead to an incentive for PRPs not to settle?

A. It could. However, the statute is clear that the Fund-balancing waiver is available only for Fund-financed actions. Of course, if such an incentive not to settle exists, PRPs may be encouraged to settle through the issuance of a unilateral order and the resulting possibility of fines and treble damages. (See CERCLA Sections 106 and 107(c)(3).)

Q13. If a remedy is undertaken solely using the Fund, and the Fund-balancing waiver is invoked, can the Agency later bring an action to recover its costs?

A. Yes. The fact that the statute allows EPA to select a remedy made less expensive by the waiver does not affect the right of the Agency to be reimbursed later under CERCLA Section 107 for the costs of that remedy.

Q14. What language should be used in the ROD for invoking the Fund-balancing waiver?

A. **Highlight 3** provides sample language for various sections of the ROD. This language is based on the hypothetical site circumstances presented in **Highlight 2** of this fact sheet and a hypothetical State law. For additional language, see Guidance on Preparing Superfund Decision Documents (the "ROD Guidance"), EPA/540/G-89/007, July 1989, page 6-5.

Highlight 3: SAMPLE ROD LANGUAGE

Sample language for the **Statutory Determinations Section** (of the Declaration):

> The selected remedy is protective of human health and the environment, complies with or meets the requirements for a waiver of Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. This remedy utilizes permanent solutions . . . .

Sample language for the **Description of Alternatives Section** (of the Decision Summary):

> The first remedial alternative, which involves the removal and off-site disposal of contaminated stream sediments, complies with the State water-quality standard at Reg. Sec. X.100, because it ensures that stream water contaminant levels will not exceed .001 ppm. The State water-quality standard is applicable to this remedial alternative because the standard requires maintenance of all in-State streams, reservoirs, and lakes at health-based levels, as established in State regulations at Sec. X.100.
>
> The second remedial alternative, which involves partial capping and surface-water diversion, justifies a waiver of the State water-quality standard found at Reg. Sec. X.100, based on the Fund-balancing waiver found in CERCLA Section 121(d)(4)(F) and NCP section 300.430(f)(1) (ii)(C)(6). Attaining the State water-quality standard for this operable unit (as contemplated by the first remedial alternative) would cost more than $1 billion. EPA has determined that this site expenditure would not provide a balance between the need for protection of human health and the environment at this site, and the availability of Fund monies to respond to other sites that may present a threat to human health and the environment.

Highlight 3: SAMPLE ROD LANGUAGE (CONTINUED)

Sample language for the **Summary of Comparative Analysis of Alternatives Section** (of the Decision Summary):

> EPA has determined that each remedial alternative is protective of human health and the environment, and complies with (or justifies a waiver of) applicable or relevant and appropriate requirements.

Sample language for the **Statutory Determinations Section** (of the Decision Summary):

> The selected remedy complies with or waives all Federal and State ARARs. The State water-quality standard was waived for surface-water cleanup at this site because attainment of this requirement would cost more than $1 billion, which would not provide a balance between the need for protection of human health and the environment at this site and the availability of Fund monies to respond to other sites that may present a threat to human health and the environment. (See CERCLA Section 121(d)(4)(F) and the NCP, 40 CFR section 300.430(f)(1)(ii)(C)(6).)

* * * * *

NOTICE: The policies set out in this fact sheet are intended solely as guidance. They are not intended, nor can they be relied upon, to create any rights enforceable by any party in litigation with the United States. EPA officials may decide to follow the guidance provided in this fact sheet, or to act at variance with the guidance, based on an analysis of site-specific circumstances. The Agency also reserves the right to change this guidance at any time without public notice.

* * * * *

A Guide to Selecting Superfund Remedial Actions

6

United States Environmental Protection Agency
Office of Solid Waste and Emergency Response
Directive: 9355.0-27FS
April 1990

EPA

A Guide to Selecting Superfund Remedial Actions

Office of Emergency and Remedial Response
Hazardous Site Control Division OS-220
Quick Reference Fact Sheet

INTRODUCTION

The Superfund program's remedy selection process is the decision-making bridge between the analysis of remedial alternatives for cleaning up a site conducted in a remedial investigation/feasibility study (RI/FS) and the explanation of the selected remedy that is documented in a Record of Decision (ROD). This fact sheet describes statutory requirements for CERCLA remedies and the process EPA has established in the 1990 revised National Contingency Plan (55 FR 8666 (3/8/90)) for meeting these requirements. This process is a general framework for reaching a judgment as to the most appropriate method of achieving protection of human health and the environment at a particular site. This framework can be streamlined as appropriate to the site.

STATUTORY REQUIREMENTS

Section 121 of CERCLA mandates that the remedial action must:

1. Protect human health and the environment;
2. Comply with applicable or relevant and appropriate requirements (ARARs) unless a waiver is justified;
3. Be cost-effective;
4. Utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable;
5. Satisfy the preference for treatment as a principal element, or provide an explanation in the ROD why the preference was not met.

EPA has established a national goal and expectations reflecting these requirements in the 1990 NCP (Sec. 300.430(a)(1)(i) and (iii). The NCP also defines nine criteria that are to be used to compare remedial alternatives, to establish the basis for the selection decision, and to

EXHIBIT 1: PROGRAM EXPECTATIONS

Protection of human health and the environment can be achieved through a variety of methods: treatment to destroy or reduce the inherent hazards posed by hazardous substances, engineering controls (such as containment), and institutional controls to prevent exposure to hazardous substances. The NCP sets out the types of remedies that are expected to result from the remedy selection process (Sec. 300.430(a)(1)(iii)).

➢ *Treat principal threats, wherever practicable.* Principal threats for which treatment is most likely to be appropriate are characterized as:

- Areas contaminated with high concentrations of toxic compounds;
- Liquids and other highly mobile materials;
- Contaminated media (e.g., contaminated ground water, sediment, soil) that pose significant risk of exposure; or
- Media containing contaminants several orders of magnitude above health-based levels.

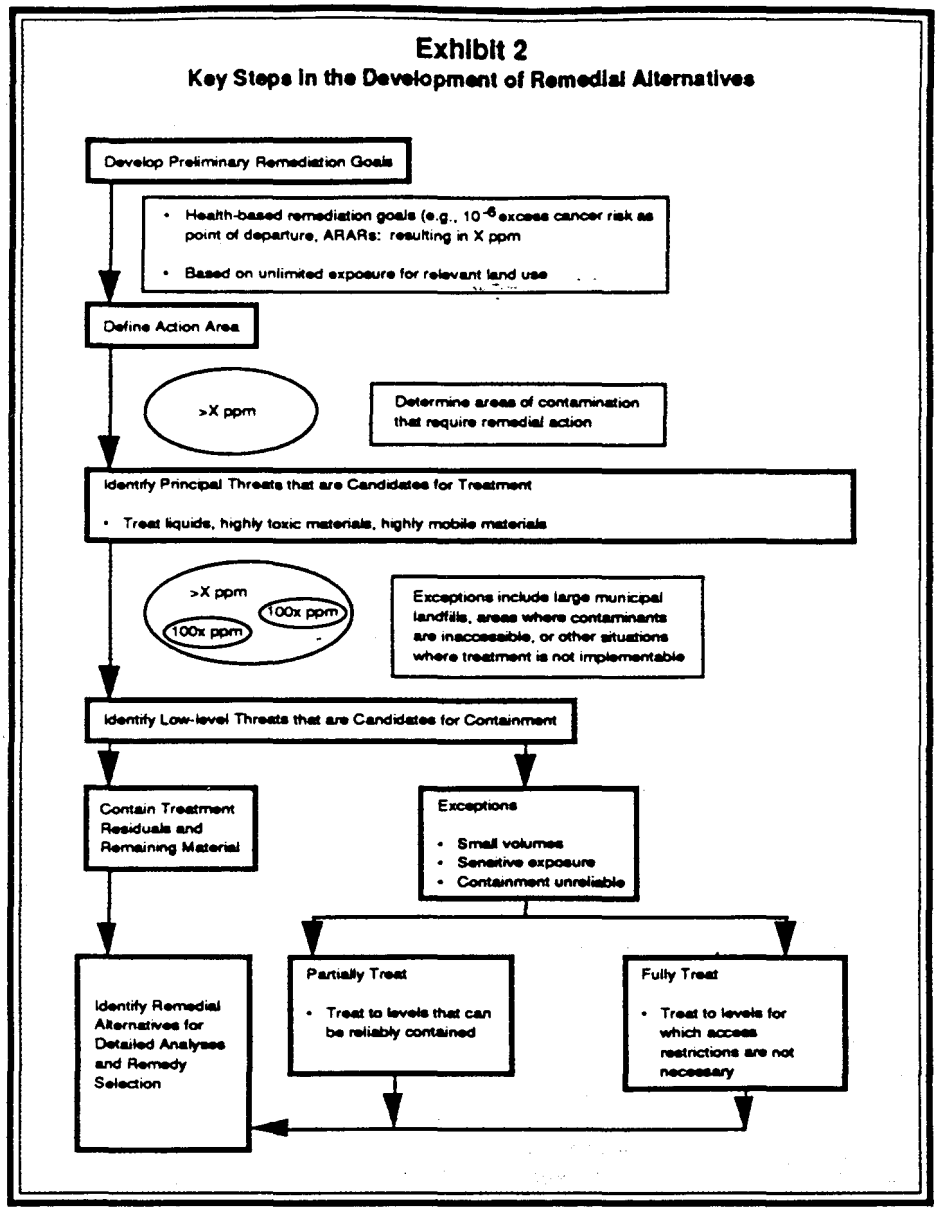
➢ *Appropriate remedies often will combine treatment and containment.* For a specific site, treatment of the principal threat(s) may be combined with containment of treatment residuals and low-level contaminated material.

➢ *Containment will be considered for wastes that pose a relatively low long-term threat or where treatment is impracticable.* These include wastes that are near health-based levels, are substantially immobile, or otherwise can be reliably contained over long periods of time; wastes that are technically difficult to treat or for which treatment is infeasible or unavailable; situations where treatment-based remedies would result in greater overall risk to the human health or the environment during implementation due to potential explosiveness, volatilization, or other materials handling problems; or sites that are extraordinarily large where the scope of the problem may make treatment of all wastes impracticable, such as municipal landfills or mining sites.

➢ *Institutional controls are most useful as a supplement to engineering controls for short- and long-term management.* Institutional controls (e.g. deed restrictions, prohibitions of well construction) are important in controlling exposures during remedial action implementation and as a supplement to long-term engineering controls. Institutional controls alone should not substitute for more active measures (treatment or containment) unless such active measures are found to be impracticable.

➢ *Innovative technologies should be considered if they offer the potential for comparable or superior treatment performance, fewer / lesser adverse impacts, or lower costs for similar levels of performance than demonstrated technologies.*

➢ *Ground waters will be returned to their beneficial uses within reasonable periods of time wherever practicable.*



demonstrate that statutory requirements have been satisfied (Sec. 300.430(f)(1)). Each of these aspects of EPA's remedy selection approach are described below.

GOAL AND EXPECTATIONS OF THE REMEDY SELECTION PROCESS

The national goal of the remedy selection process is "to select remedies that are protective of human health and the environment, that maintain protection over time, and that minimize untreated waste" (NCP Sec. 300.430(a)(1)(i)).

While protection of human health and the environment can be achieved through a variety of methods, this goal reflects CERCLA's emphasis on achieving protection through the aggressive, but realistic use of treatment. The 1990 NCP presents EPA's expectations regarding circumstances under which treatment, as well as engineering and institutional controls, are most likely to be appropriate (Sec. 300.430(a)(1)(iii), see Exhibit 1). These expectations are intended primarily to assist in focusing the development of alternatives in the FS (see The Feasibility Study: Development and Screening of Alternatives, OSWER Directive 9355.3-01FS). These expectations do not substitute for site-specific balancing of the nine criteria to determine the maximum extent to which treatment can be practicably used in a cost-effective manner for a operable unit.

Exhibit 2 illustrates the alternatives development process, as shaped by the expectations. The process begins with the identification of preliminary remediation goals, which provide initial estimates of the contaminant concentrations/risk levels of concern. Based on ARARs, readily available toxicity information, and current and future land use, preliminary remediation goals are initial health-based levels and are used to define site areas that may require remedial action (i.e., action areas). Areas onsite with contaminant concentrations several orders of magnitude (e.g., 2) above these preliminary remediation goals are candidate areas for treatment. Areas onsite with contaminant concentrations within several orders of magnitude of these preliminary remediation goal levels are candidate areas for containment. The remediation goals, action areas, and target treatment/containment areas are refined throughout the RI/FS process as additional information becomes available. The final determination of remediation goals, action areas, and the appropriate degree of treatment and containment are made as part of the remedy selection.

THE REMEDY SELECTION PROCESS

Overview

The remedy selection process begins with the identification of a preferred alternative from among those evaluated in detail in the FS by the lead agency, in consultation with the support agency. The preferred alternative is presented to the public in a Proposed Plan that is

EXHIBIT 3: NINE EVALUATION CRITERIA

EPA has developed nine criteria to be used to evaluate remedial alternatives to ensure all important considerations are factored into remedy selection decisions. These criteria are derived from the statutory requirements of Section 121, particularly the long-term effectiveness and related considerations specified in Section 121(b)(1), as well as other additional technical and policy considerations that have proven to be important for selecting among remedial alternatives.

Threshold Criteria

The two most important criteria are statutory requirements that must be satisfied by any alternative in order for it to be eligible for selection.

1. *Overall protection of human health and the environment* addresses whether or not a remedy provides adequate protection and describes how risks posed through each exposure pathway (assuming a reasonable maximum exposure) are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

2. *Compliance with applicable or relevant and appropriate requirements* (ARARs) addresses whether a remedy will meet all of the applicable or relevant and appropriate requirements of other Federal and State environmental laws or whether a waiver can be justified.

Primary Balancing Criteria

Five primary balancing criteria are used to identify major trade-offs between remedial alternatives. These trade-offs are ultimately balanced to identify the preferred alternative and to select the final remedy.

1. *Long-term effectiveness and permanence* refers to the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met.

2. *Reduction of toxicity, mobility, or volume through treatment* is the anticipated performance of the treatment technologies a remedy may employ.

3. *Short-term effectiveness* addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period, until cleanup goals are achieved.

4. *Implementability* is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.

5. *Cost* includes estimated capital and operation and maintenance costs, and net present worth costs.

Modifying Criteria

These criteria may not be considered fully until after the formal public comment period on the Proposed Plan and RI/FS report is complete, although EPA works with the State and community throughout the project.

1. *State acceptance* addresses the support agency's comments. Where the State or other Federal agency is the lead agency, EPA's acceptance of the selected remedy should be addressed under this criterion. State views on compliance with State ARARs are especially important.

2. *Community acceptance* refers to the public's general response to the alternatives described in the Proposed Plan and the RI/FS report.

The 1990 NCP at 55 FR 8719-23 describes how the detailed analysis of alternatives is to be performed using these criteria. The detailed analysis is the information base upon which the remedy selection decision is made. Chapter 7 of the "Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA" (October 1988) provides further detail on the process.

issued for comment along with the RI/FS. Upon receipt of public comments on the Proposed Plan, the lead agency consults with the support agency to determine if the preferred alternative remains the most appropriate remedial action for the site or operable unit. The final remedy is selected and documented in a Record of Decision.

Considering the Nine Criteria

The identification of a preferred alternative and final selection of a remedy is derived from consideration of nine evaluation criteria in three major steps, as described in the 1990 NCP (Sec. 300.430(f)(1)(ii)(E)). The nine criteria are presented in Exhibit 3. The steps in which the criteria are considered are depicted in Exhibit 4 and discussed below.

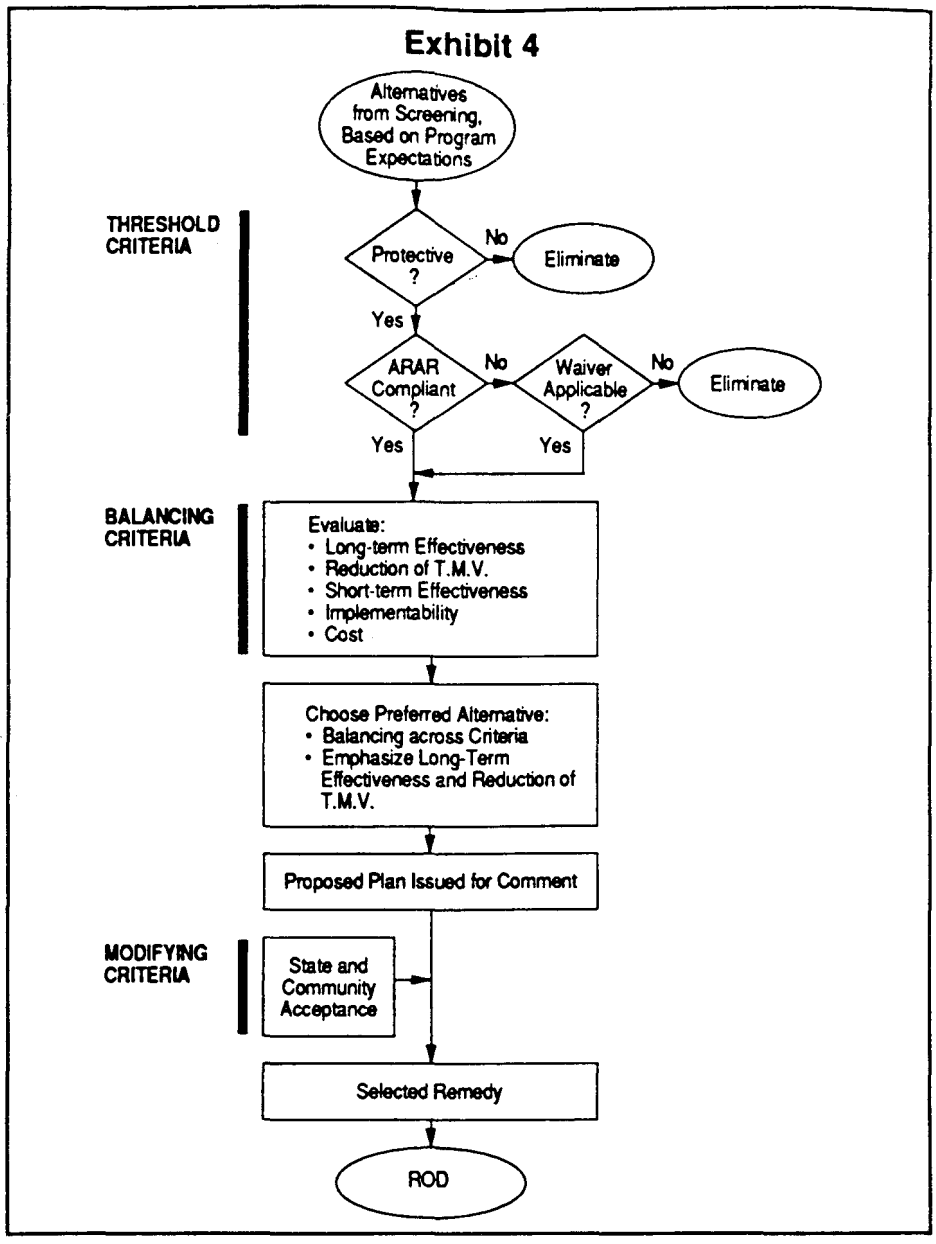
Threshold Criteria

The first step of remedy selection is to identify those alternatives that satisfy the threshold criteria. Only those alternatives that provide adequate protection of human health and the environment and comply with ARARs (or justify a waiver) are eligible for selection. Alternatives that do not satisfy the threshold criteria should not be evaluated further.

Primary Balancing Criteria

The second step involves the balancing of tradeoffs among protective and ARAR-compliant alternatives with respect to the five primary balancing criteria (and modifying criteria, if known). In this step, alternatives are compared with each other based on their long-term effectiveness and permanence, reduction in toxicity, mobility, or volume achieved through treatment, implementability, short-term effectiveness, and cost. The sequence in which the criteria are generally considered, and pertinent considerations related to each, are noted below.

1. Long-term effectiveness and permanence is a major theme of CERCLA Section 121, and, therefore, is one of the two most important criteria used during remedy selection to determine the maximum extent to which permanence and treatment are practicable. This factor will often be decisive where alternatives vary significantly in the types of residuals that will remain onsite and/or their respective long-term management controls.



2. Reduction in the toxicity, mobility, or volume of contaminants achieved through the application of treatment technologies is the other criterion that will be emphasized during remedy selection in determining the maximum extent to which permanent solutions and treatment are practicable. Remedies that use treatment to address materials comprising the principal threats posed by a site are preferred over those that do not. Treatment as part of CERCLA remedies should generally achieve reductions of 90 to 99 percent in the concentrations or mobility of individual contaminants of concern. There will, however, be situations where reductions outside the 90 to 99 percent range will be appropriate to achieve site-specific remediation goals.

3. The short-term effectiveness of an alternative includes consideration of the time required for each alternative to achieve protection, as well as adverse short-term impacts that may be posed by their implementation. Many potential adverse impacts can be avoided by incorporating mitigative steps into the alternative. Poor short-term effectiveness can weigh significantly against an option and can, in fact, result in an alternative being rejected as unprotective if adverse impacts cannot be adequately mitigated.

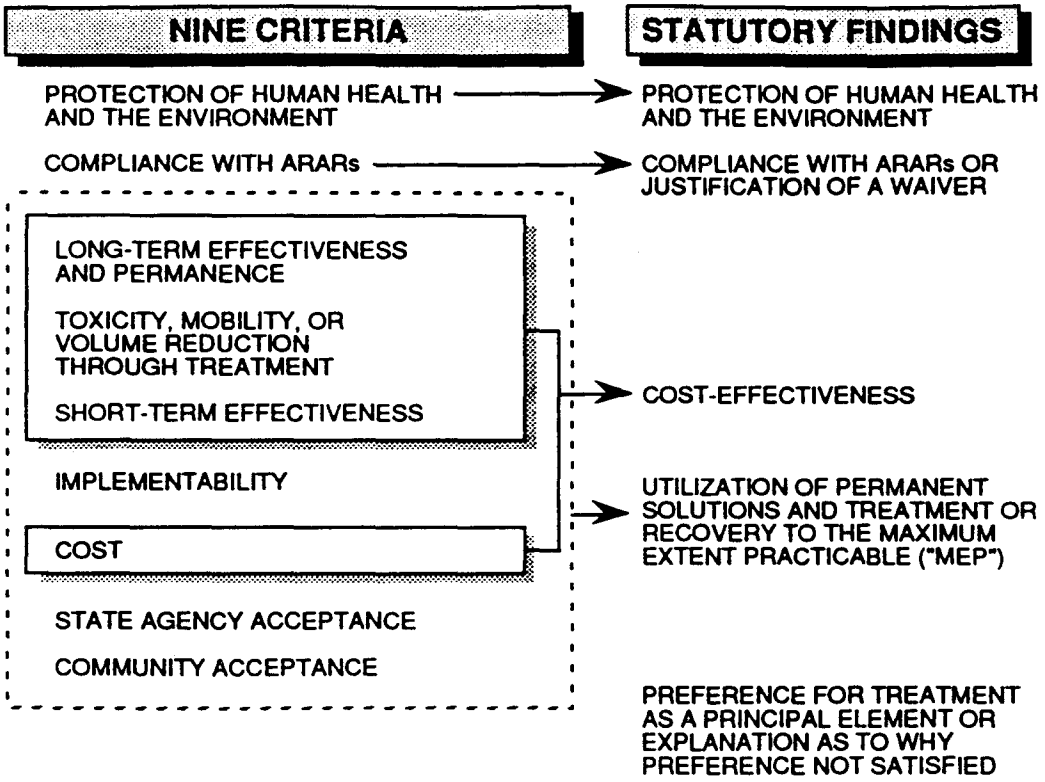
4. Implementability is particularly important for evaluating remedies at sites with highly heterogeneous wastes or media that make the performance of certain technologies highly uncertain. Implementability is also significant when evaluating technologies that are less proven and remedies that are dependent on a limited supply of facilities (e.g., TSCA - permitted land disposal facility), equipment (e..g., in-situ vitrification units), or experts.

5. Cost may play a significant role in selecting between options that appear comparable with respect to the other criteria, particularly long-term effectiveness and permanence, or when choosing among treatment options that provide similar performance. Cost generally will not be used to determine whether or not principal threats will be treated, except under special circumstances that make treatment impracticable (see expectations). Cost can never be used to pick a remedy that is not protective.

Modifying Criteria

If known at the completion of the RI/FS, state (support agency) and community acceptance of the alternatives should be considered with the results of the balancing criteria evaluation to identify the preferred alternative. After the public comment period, state and community acceptance are again considered, along with any new information, and may prompt modification of the preferred alternative.

Exhibit 5
Relationship of the Nine Criteria to the Statutory Findings



Identification of a Preferred Alternative

Once the relative performance of the protective and ARAR-compliant alternatives under each criterion has been established, preliminary determinations of which options are cost-effective and which alternatives utilize permanent solutions and treatment technologies to the maximum extent practicable are made to identify the preferred alternative. Exhibit 5 illustrates the relationship between the nine criteria and the statutory requirements for remedy selection.

Cost-effectiveness is determined by comparing the costs of all alternatives being considered with their overall effectiveness to determine whether the costs are proportional to the effectiveness achieved. Overall effectiveness for the purpose of this determination includes long-term effectiveness and permanence; reduction of toxicity, mobility, and volume through treatment; and short-term effectiveness. More than one alternative can be cost-effective.

The determination of which cost-effective alternative utilizes permanent solutions and treatment to the maximum extent practicable is a risk management judgment made by the decisionmaker who balances the tradeoffs among the alternatives with respect to the balancing criteria (and modifying criteria to the extent they are known). As a general rule, those criteria that distinguish the alternatives the most will be the most decisive factors in the balancing. See Exhibit 6 for a summary of criteria likely to be important in certain site situations. The alternative determined to provide the best balance of trade-offs, as considered in light of the statutory mandates and preferences, as well as the NCP goal and expectations, is identified as the preferred alternative and presented to the public for comment in a Proposed Plan.

Final Selection of Remedy

Upon receipt of public comments, the preferred alternative is reevaluated in light of any new information that has become available, including State and community acceptance, if previously unknown. This new information should be considered to determine whether an option other than the preferred alternative better fulfills the statutory requirements. The decisionmaker's final judgment is documented in a Record of Decision.

Exhibit 6

EXAMPLES OF PROMINENT CRITERIA AND EXPECTATIONS FOR SELECTED SITE SITUATIONS

SITUATION	PROMINENT CRITERIA	EXPECTED RESULT OF REMEDY SELECTION*
Small area of high levels of toxic contaminants (e.g., lagoon, hot spots)	Long-term effectiveness, Reduction of toxicity, mobility, or volume through treatment	Treatment is preferred when highly toxic material is a principal threat at a site
Highly mobile contaminants (e.g., liquids, volatiles, metals)	Long-term effectiveness, Reduction of mobility through treatment	Treatment is preferred when highly mobile material is a principal threat at a site
Very large volume of material contaminated marginally above health-based levels (e.g., mine tailings one order of magnitude above health-based levels in soil)	Implementability, Cost	Containment may afford high level of long-term effectiveness; treatment may be difficult to implement because of insufficient treatment capacity for large volume of material, and cost of treatment may be prohibitive due to large scope of site
Complex mixture of heterogeneous waste without discrete hot spots (e.g., heterogeneous municipal landfill waste)	Implementability, Short-term effectiveness, Cost	Treatment of heterogeneous waste often difficult or infeasible, reducing implementability; containment avoids short-term impacts and uncertainties associated with excavation; cost of treatment may be prohibitive
Soils contaminated with high concentrations of VOCs	Long-term effectiveness, Short-term effectiveness	In-situ treatment may be preferred over excavation because of negative short-term impacts and high cost of excavation
Contaminated ground water	Long-term effectiveness, Short-term effectiveness	Ground waters should be returned to beneficial use as soon as is practicable

* These are only examples and have been highly simplified for illustration purposes. They are not intended to prescribe certain remedies for certain situations.

NOTICE: The policies set out in this memorandum are intended solely for the guidance of Government personnel. They are not intended, nor can they be relied upon, to create any rights enforceable by any party in litigation with the United States. EPA officials may decide to follow the guidance provided in this memorandum, or to act at variance with the guidance, based on an analysis of specific site circumstances. Remedy selection decisions are made and justified on a case-specific basis. The Agency also reserves the right to change this guidance at any time without public notice.

CERCLA Compliance With Other Laws Manual
CERCLA Compliance with State Requirements

7

United States Environmental Protection Agency

Office of Solid Waste and Emergency Response

Publication 9234.2-05/FS

December 1989

EPA

CERCLA Compliance With Other Laws Manual

CERCLA Compliance with State Requirements

Office of Emergency and Remedial Response
Office of Program Management OS-240

Quick Reference Fact Sheet

The 1986 Superfund Amendments and Reauthorization Act (SARA) adopts and expands a provision in the 1985 National Contingency Plan (NCP) that remedial actions must at least attain applicable or relevant and appropriate requirements (ARARs). Section 121(d) of CERCLA, as amended by SARA, requires attainment of Federal ARARs and of State ARARs in State environmental or facility siting laws when the State requirements are promulgated, more stringent than Federal laws, and identified by the State in a timely manner.

To implement the ARARs provision, EPA has developed guidance, CERCLA Compliance With Other Laws Manual: Parts I and II (Publications 9234.1-01 and 9234.1-02). EPA is preparing a series of short fact sheets that summarize these guidance documents. This fact sheet provides a guide to Chapter 6 of Part II, which addresses CERCLA compliance with State requirements. The material covered here is based on SARA and on policies in the proposed revisions to the NCP. The final NCP may adopt policies different from those covered here and should, when promulgated, be considered the authoritative source.

I. INTRODUCTION TO STATE ARARs

Prior to SARA, the NCP classified all State requirements as criteria that EPA should consider when selecting a remedy. The amendments elevated to the level of potential ARARs any "promulgated" State requirements that are "more stringent" than Federal requirements (see **Highlight 1** for specific criteria).

Highlight 1: CRITERIA FOR A STATE REQUIREMENT TO QUALIFY AS AN ARAR

In order to qualify as a State ARAR, a State requirement should be:

- A State law;
- An environmental or facility siting law;
- Promulgated;
- More stringent than the Federal requirement;
- Identified in a timely manner; and
- Consistently applied.

State requirements, like Federal requirements, must also be substantive in nature to qualify as ARARs. Administrative or procedural State requirements are not ARARs. Elements of State ARARs are discussed below.

Generally, laws and regulations adopted at the State level, as distinguished from the regional, county, or local level, are considered to be State ARARs. Local laws in themselves are not ARARs. However, requirements that are developed by a local or regional body and are both adopted and legally enforceable by the State may be potential State ARARs. Potential State ARARs may also be found where local or regional boards have established standards that become part of a legally enforceable State "plan."

II. STATE ENVIRONMENTAL OR FACILITY SITING LAWS AS ARARs

Several common types of State statutes that may provide State ARARs are described below. Guidance on compliance with these requirements is provided.

A. State Siting Requirements (Location Standards)

State siting requirements may restrict the location of existing and expanding or new hazardous waste treatment, storage, and disposal (TSD) facilities (**Highlight 2** provides the triggers for State siting

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requirements). Siting restrictions have generally been left to the States to implement. However, the Resource Conservation and Recovery Act (RCRA) contains limited siting provisions that restrict locations in fault zones, 100-year floodplains, salt dome and salt bed formations, and underground caves. As of 1987, 33 States had promulgated siting requirements that were more stringent than Federal requirements.[1]

Highlight 2: TRIGGERS FOR STATE SITING REQUIREMENTS

State siting requirements may be triggered as potential ARARs when:

- An existing hazardous waste site is in a restricted location, and a corresponding action is required (such as a removal, remediation, design, or modified care);
- A new hazardous waste unit is to be created in a restricted location; or
- A non-land-based unit is brought on-site.

The application of a State siting law to a Superfund action also depends upon the State's definition of a "new" or "existing" site. Because Superfund sites generally represent pre-existing (and unplanned) situations, State restrictions for new or operating facilities may not apply to Superfund sites.

State siting requirements are commonly found in State laws that address environmentally sensitive areas such as wetlands, endangered species habitats, gamelands, parks, preserves, and underground mining/subsidence areas. States also protect ground water and surface water through a variety of location standards such as: (1) prohibitions of facilities in certain locations; (2) quantitative setback distances from water supplies or other water bodies; (3) quantitative thickness or hydraulic conductivity in soil barriers; and (4) designation of acceptable soil or rock type for facility siting. Finally, buffer zones may also contain location standards ranging from specific setback distances to general statements that preclude interference with population areas.

B. Discharge of Toxic Pollutants to Surface Waters

The Clean Water Act (CWA) requires States to identify water bodies that may be adversely affected by toxic pollutants and to develop criteria to protect these areas. State toxic pollutant regulations are generally presented in the form of narrative goals rather than numeric criteria. For example, State narrative requirements may be expressed in terms predicated upon specific toxicity testing procedures or in terms of whole effluent toxicity limits. All substantive aspects of these narrative requirements may be ARARs for CERCLA discharges. In addition, general prohibitions on toxic pollutant discharges of known carcinogens may be State ARARs for on-site CERCLA discharges. All such State requirements should be examined for any exemptions of Federal activities.

C. Antidegradation Requirements for Surface Water

The CWA requires all States to adopt statutes or regulations that prevent the degradation of high-quality waters. In addition, States may have promulgated other antidegradation requirements for surface waters (see **Highlight 3** for typical State antidegradation requirements).

Highlight 3: TYPICAL STATE ANTIDEGRADATION REQUIREMENTS

Typical State antidegradation requirements will mandate the:

- Maintenance of existing in-stream designated beneficial uses;
- Maintenance of high-quality waters unless the State decides to allow limited degradation where economically or socially justifiable;
- Maintenance of the quality of Outstanding National Resource Waters (ONRW); and
- Use of best available technology for treatment of new or increased pollution into high-quality waters.

If a CERCLA remedial action involves a point-source discharge of treated effluent to high-quality surface waters, these various State antidegradation requirements may be ARARs for the discharge.

D. Antidegradation Requirements for Ground Water

Like antidegradation requirements for surface water, antidegradation requirements for ground water are generally prospective in nature and are designed to prevent further degradation of water quality. If a State has developed antidegradation requirements for ground water, CERCLA remedial actions involving injection of partially treated water into a pristine aquifer may be affected. These State requirements would not, however, require cleanup to the aquifer's original quality prior to contamination. However, there may be a State cleanup

[1] Temple, Barker, and Sloane, Inc., Review of State Hazardous Waste Facility Criteria, Revised Draft Final Report. U.S. EPA, Washington, DC, 1987.

law that specifically requires cleanup to background, which would constitute an ARAR for the remediation.

III. "PROMULGATED" LAWS AS ARARs

A State requirement must be promulgated to qualify as an ARAR. A State requirement is promulgated if it is: (1) legally enforceable; and (2) of general applicability (see **Highlight 4**).

Highlight 4: PROMULGATED STATE LAWS

- **Legal Enforceability:** State requirements may be legally enforceable in several ways. State statutes or regulations may either: (1) have their own specific enforcement provisions written into them; or (2) be enforced through the State's general legal authority.
- **General Applicability:** State requirements must apply to a broader universe than Superfund sites. For example, a State requirement having general applicability ("of general applicability") would apply to all hazardous waste sites in the State that meet the jurisdictional prerequisites of the requirement, not just to CERCLA sites.

Promulgated requirements are found in State statutes and regulations that have been adopted by authorized State agencies. Statute numbers, enactment dates, and effective dates may indicate whether the requirements have been promulgated. Such promulgated requirements may be either numerical or narrative in form.

A. Criteria That Are "To Be Considered" (TBCs)

Although they are not ARARs, State advisories, guidance and policies, etc., may help EPA define and develop protective remedies and interpret State laws. These State policies and guidance, known as "to be considered" (TBCs), are not potential ARARs because they are neither promulgated nor enforceable. It may be necessary to consult TBCs to interpret ARARs or to determine preliminary remediation goals when ARARs do not exist for particular contaminants. States should identify or communicate to EPA TBCs that they consider to be pertinent to the remedy.

B. Narrative Standards

Occasionally, a State may submit as an ARAR a narrative State statute. While narrative State statutes may be ARARs, unpromulgated methodologies that are designed to implement narrative statutes are not. EPA has discretion to determine whether numbers obtained from unpromulgated methodology should be met, or whether they constitute TBCs. It is important to note, however, that numbers derived from State narrative statutes may be ARARs if the narrative statute is an ARAR, and has implementing regulations that are also ARARs.

IV. "MORE STRINGENT" LAWS AS ARARs

CERCLA requires remedies to comply with State requirements that are more stringent than Federal requirements (see **Highlight 5** for a definition of "more stringent").

Highlight 5: CRITERIA FOR "MORE STRINGENT"

- State requirements are more stringent than Federal requirements if the State program has Federal authorization and the State requirements are "at least" as stringent.
- State programs that do not have a Federal counterpart are generally more stringent because they add new requirements.
- Stringency comparisons may be necessary if a State program is not Federally authorized but has a Federal counterpart.

It is important to note that EPA believes that if a State is authorized to implement a program in lieu of a Federal agency, State laws arising out of that program constitute the ARARs instead of the Federal authorizing legislation. A stringency comparison is unnecessary because State regulations under Federally authorized programs are considered to be Federal requirements.

V. IDENTIFYING AND COMMUNICATING STATE ARARs IN A TIMELY MANNER

CERCLA requires States to identify ARARs in a timely manner. As a result, EPA and a State may enter into a Superfund Memorandum of Agreement (SMOA) which, among other things, establishes a schedule for communicating ARARs. In the absence of a SMOA, States must identify ARARs within certain timeframes (identified below) in order for that identification to be considered "timely". EPA is not legally required to consider potential State ARARs that are not identified within these timeframes. The responsibilities of a State to communicate ARARs will vary depending upon its role at the site (see **Highlight 6** for State roles and responsibilities).

A. Critical Points for Identifying State ARARs

There are particular points in the preremedial and remedial processes during which the lead and support agencies must communicate with each other. SMOAs may identify timeframes for communicating potential ARARs. **Highlight 7** presents the critical points in the

Highlight 6: STATE ROLES AND RESPONSIBILITIES

As the support agency, the State is responsible for:

- Receiving and reviewing information about proposed Federal ARARs and TBCs, as early as site characterization;
- Coordinating State input on ARARs from all State agencies;
- Identifying State ARARs during the RI/FS;
- Justifying proposed State ARARs; and
- Reviewing ARARs identified in the proposed plan and ROD.

As the lead agency, the State is responsible for:

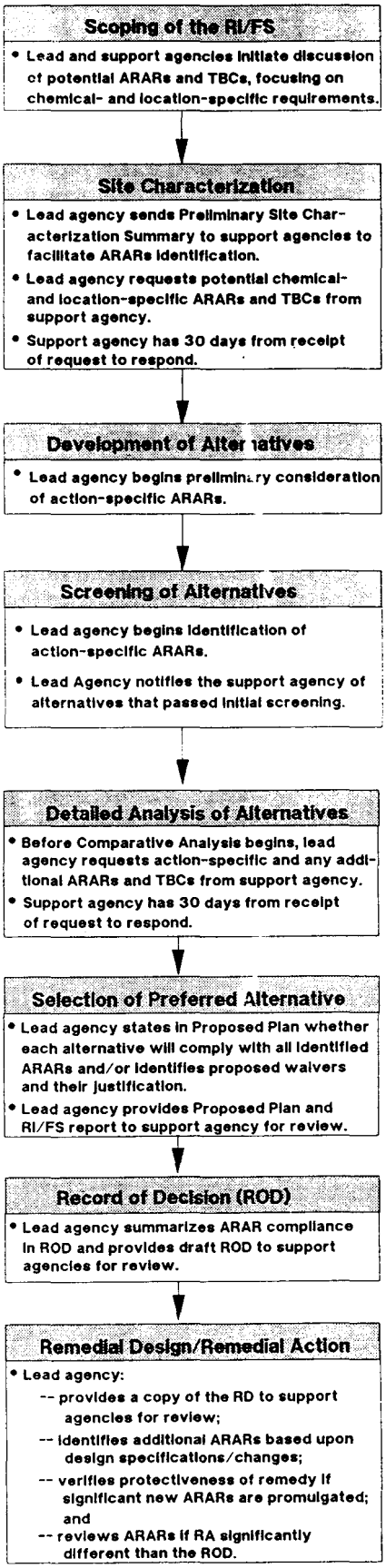
- Requesting EPA's identification of Federal ARARs;
- Identifying State ARARs during the RI/FS;
- Identifying ARARs and waivers in the proposed plan; and
- Documenting compliance with ARARs in the draft ROD.

pre-remedial and remedial processes if no SMOA exists, or if the SMOA fails to address such timeframes. It is important to note that regardless of their role, EPA and the States each have an unvarying responsibility. States are always responsible for identifying State ARARs and communicating them to EPA in a timely manner. EPA is always responsible for making the final determination on ARARs as part of remedy selection, regardless of who conducts the RI/FS (i.e., EPA, the State, or PRP), or who recommends the remedy (i.e., EPA or the State), except for State-lead non-Fund-financed sites.

B. EPA Responsibilities for Communicating Waivers

If EPA intends to waive any State-identified ARARs in its proposed plan, or does not agree with the State that a certain State standard is an ARAR, it must formally notify the State either: (1) when the Agency submits the RI/FS for State review; or (2) when the Agency responds to the State's submission of the RI/FS. In addition, EPA must respond to State comments on waivers from, or disagreements about, State ARARs after making the RI/FS and proposed plan available for public comment.

Highlight 7: CRITICAL POINTS FOR IDENTIFYING ARARS



C. State Responsibilities for Documenting State ARARs

To demonstrate that the State requirement is an ARAR, States are required by the NCP to provide citations to the statute or regulation number. In addition, States should provide the requirement's effective date and description of scope, where appropriate. Furthermore, States should provide evidence that the requirement is more stringent than the Federal requirement. Finally, States should also describe in writing the relationship between the State requirement and the site or action, to show that the State requirement is applicable or relevant and appropriate to that particular site or action.

VI. STATE STANDARD WAIVERS

A. Statutory Waivers

Of the six ARAR waivers set forth in CERCLA, one applies exclusively to State ARARs: inconsistent application of the State standard by the State. This waiver may be invoked when evidence exists that a State standard has not been or will not be consistently applied to both non-NPL and NPL sites within the State. The waiver may be used, for example, for a State standard that was promulgated but never applied, or for a standard that has been variably applied or enforced. A State standard is presumed to have been consistently applied unless there is evidence to the contrary.

B. State Waivers

In addition to the waivers provided by CERCLA, many State regulations have their own waivers or exceptions to their requirements. When a State requirement has a waiver that is applicable, the State requirement does not have to be met. EPA makes the final determination as part of the selection of remedy.

State waivers are common components of State siting requirements. Usually only temporary or emergency situations qualify for waivers of State siting requirements. Remedial actions at Superfund sites may qualify for State waivers depending upon their design and the particular waiver requirements. To determine if a remedial action qualifies for a State waiver, the State waiver provision should be examined for its duration, circumstances that justify its use, and any renewal provisions.

C. State-Wide Bans

Under CERCLA section 121(d), a State-wide ban prohibiting land disposal of hazardous substances is not an ARAR unless the following three criteria are met:

- The State requirement is of general applicability and was adopted by formal means;
- The State requirement was adopted on the basis of hydrologic, geologic, or other relevant considerations and was not adopted for the purpose of precluding on-site remedial actions or other land disposal for reasons unrelated to protection of human health and the environment; and
- The State arranges for, and assures payment of the incremental costs of, utilizing a facility for hazardous waste disposal.

State and Local Involvement in the Superfund Program

8

United States Environmental Protection Agency

Office of Solid Waste and Emergency Response

Publication No. 9375.5-01/FS
Fall 1989

EPA

State and Local Involvement In The Superfund Program

Office of Emergency and Remedial Response
Hazardous Site Control Division (OS-220)

Quick Reference Fact Sheet

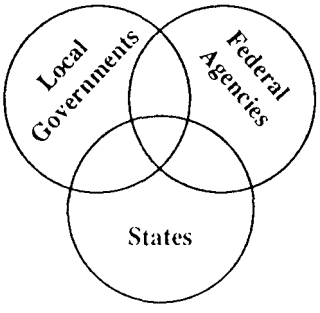
INTRODUCTION

When Congress first enacted the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) in 1980, it required States to be active partners in conducting Superfund response actions. Under CERCLA, States with the technical and management capability to carry out a response action may be authorized to lead cleanup efforts at a site. Local communities and certain local government agencies (such as fire departments and public health agencies) also participate in Superfund cleanup operations.

In 1986, Congress amended CERCLA and passed the Superfund Amendments and Reauthorization Act of 1986 (SARA). CERCLA, as amended, strengthens the partnership between the Federal Government and State and local authorities.

State and local governments play an important role in ensuring effective, efficient and well-coordinated cleanups. Often local authorities are the first responders at the scene of a hazardous substance release, providing critical fire protection, security, and health-related services.

HOW STATES AND LOCAL GOVERNMENTS BECOME INVOLVED



The law authorizes the Federal Government to take response actions at a site (Federal-lead), or to transfer the necessary funds and management responsibility to a State (State-lead), to political subdivisions of States or to federally recognized Indian Tribes. Regardless of who has the lead, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 CFR Part 300) is the master plan for Superfund response. Together, CERCLA, as amended, and the NCP, ensure States' involvement in response by requiring EPA to work with States during: 1) negotiations with potentially responsible parties (PRPs), 2) the National Priorities List (NPL) listing and deleting process, 3) study of the site to determine cleanup options, and 4) selection and implementation of the remedy.

CERCLA, as amended, prohibits EPA from providing for a remedial action unless the State makes the following assurances or guarantees:

- Pay part of the cleanup. A State is required to pay 10 percent of the cost of actual cleanup only if the site was privately operated at the time of the hazardous substance release. A State is required to pay 50 percent or more of the total response costs incurred by Superfund if the State or locality operated the site at the time hazardous wastes were disposed there. For example, if an old municipal landfill is found leaking hazardous chemicals, the State would be required to provide at least half the cost of an entire Superfund response. Political subdivisions may provide the cost share, but the State must assure payment in case of default.

- Ensure the availability of a facility(s) for disposal of hazardous materials removed from a site during cleanup. Disposal facilities must comply with all Federal and State requirements, and must not threaten the quality of human health and the environment.

- Ensure that the State's disposal capacity can adequately handle all wastes generated within the State over 20 years (effective starting in 1989).

- Operate and maintain the selected remedy once the cleanup is completed and is proven to be operational and functional. The State assumes full responsibility for future operation and maintenance. Although a political subdivision may manage the actual operation and maintenance of the selected remedy, the State maintains ultimate responsibility.

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OVERVIEW OF CERCLA

Congress enacted the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), commonly known as Superfund, in 1980. This law created a tax on the chemical and petroleum industries and provided broad Federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or welfare or the environment. Over five years, $1.6 billion were collected, and the tax went to a Trust Fund for cleaning up abandoned or uncontrolled hazardous waste sites. The U.S. Environmental Protection Agency (EPA) is responsible for running the Superfund program.

On October 17, 1986, the Superfund Amendments and Reauthorization Act (SARA) was signed into law. SARA increases the Trust Fund to $8.5 billion over five years, and strengthens EPA's authority to conduct cleanup and enforcement activities.

Under the Superfund program, EPA can:

- Pay for the cleanup of hazardous waste sites when those responsible for such sites cannot be found or are unwilling or unable to clean up a site.
- Take legal action to force those responsible for hazardous waste sites that threaten public health or the environment to clean up those sites or pay back the Federal Government for the costs of cleanup.

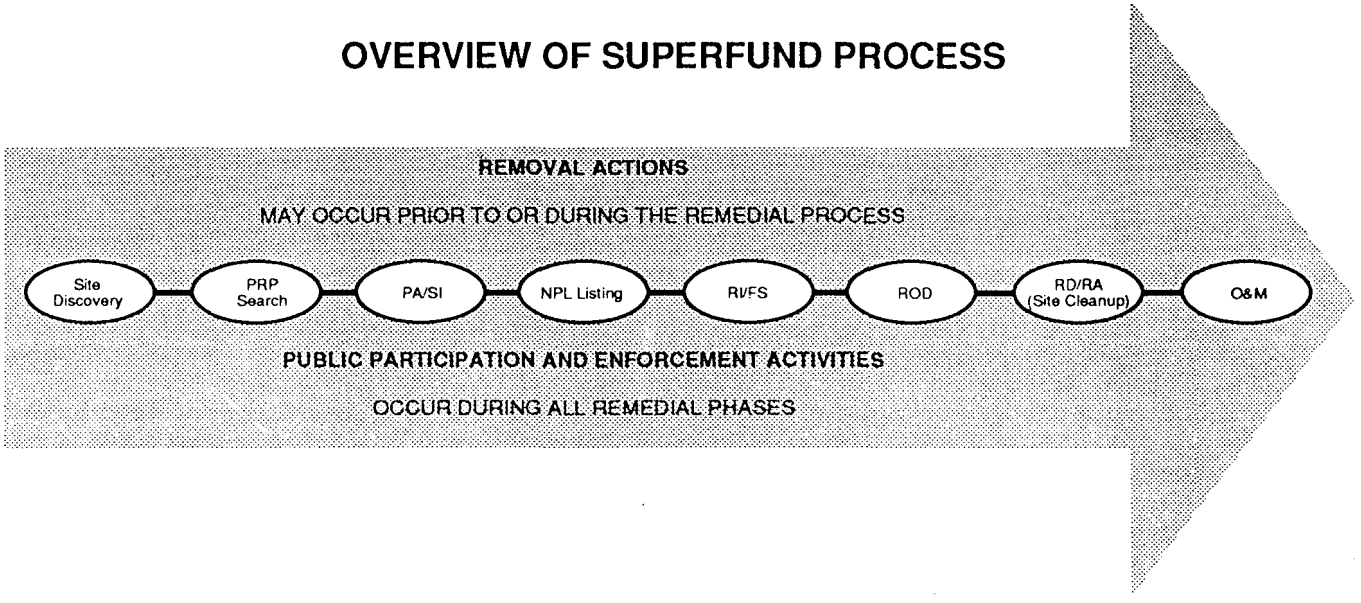
The law authorizes two kinds of response actions:

- Short-term ***removals*** where actions may be taken to address releases or threatened releases requiring prompt response.
- Longer-term ***remedial*** responses that permanently and significantly reduce the dangers associated with releases or threats of releases of hazardous substances that are serious but not immediately life threatening. They can be conducted only at sites on EPA's National Priorities List (NPL).

Remedial and removal responses include, but are not limited to :

- Destroying, detoxifying or immobilizing the hazardous substances on the site through incineration or other treatment technologies.
- Containing the substances on-site so that they can safely remain there and present no further threat.
- Removing the materials from the site to an EPA-approved, licensed hazardous waste facility for treatment, containment, or destruction.
- Identifying and restoring contaminated ground water, halting further spread of the contaminants, or in some circumstances providing an alternate source of drinking water.

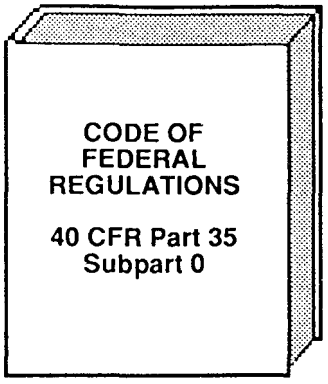
OVERVIEW OF SUPERFUND PROCESS



State and local involvement in the Superfund program varies depending upon the type of response action. During a removal action, which is an action taken over the short term to address a release or threatened release of hazardous substances, often local authorities are the first responders at the incident. For example, a city fire or police department can respond immediately to hazardous substance releases or may serve in a support role to a State or Federal authority conducting removal cleanup activities.

During a remedial action, which is an action intended to stop permanently or substantially reduce over the long term a release or threatened release of hazardous substances, there are many ways for State and local governments to participate. States may conduct the Preliminary Assessment and Site Inspection (PA/SI), the Remedial Investigation and Feasibility Study (RI/FS) or the Remedial Design and Remedial Action (RD/RA). States and local governments also may help identify potentially responsible parties and inform local communities about a cleanup. Whether a site requires a remedial or removal response, the role of State and local agencies is critical in protecting public health and the environment.

MECHANISMS TO ENSURE STATE AND LOCAL INVOLVEMENT



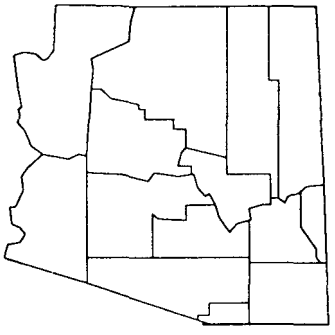
Superfund provides the following mechanisms for State and local involvement:

- Cooperative Agreements transfer funds from EPA to States, political subdivisions thereof, and/or Indian Tribal governments to undertake the lead for site-specific response, or to defray their costs associated with participation in Federal-lead or political subdivision-lead responses or other CERCLA implementation activities. It is also the legally binding document to get assurances when the State does a remedial action. If a State receives funds through a Cooperative Agreement, the State is not prohibited from entering into intergovernmental agreements with political subdivisions for Superfund response.

- Superfund State Contracts are joint, legally binding agreements between EPA and a State or Indian Tribe. Superfund State Contracts provide a vehicle for assuring the transfer of State cost-sharing funds when EPA is leading a response action, for documenting that States meet all required assurances under CERCLA, as amended, and for documenting CERCLA Section 121(f) involvement during a political subdivision-lead response.

Procedures for using Cooperative Agreements and Superfund State Contracts for Superfund responses can be found at 40 CFR Part 35 Subpart O.

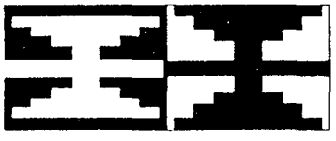
THE ROLE OF POLITICAL SUBDIVISIONS



A political subdivision may be directly involved in a Superfund remedial cleanup. States, however, are required to be active partners. What legally constitutes a political subdivision differs from State to State. It is the responsibility of each State to determine what unit of government meets its legislative definition of a political subdivision (for example, a region, county, or town).

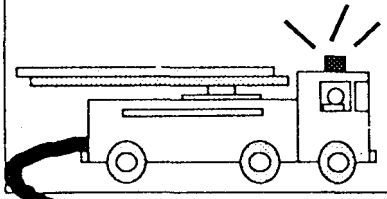
If a political subdivision leads the Superfund response, there are two options available to ensure appropriate State involvement and to provide the required assurances. In the first option, EPA enters into a Cooperative Agreement directly with the political subdivision. In this scenario, EPA must also enter into a three-party Superfund State Contract, which specifies how EPA, the State, and political subdivision will comply with CERCLA Sections 104 and 121 and the NCP. In the second option, EPA enters into a Cooperative Agreement directly with the State. The State, in turn, "passes through" the funds to a political subdivision and enters into a two-party Intergovernmental Agreement with the political subdivision prior to either the State or political subdivision incurring costs for field activities. This second option is similar to a State hiring a contractor to conduct response activities.

THE ROLE OF INDIAN TRIBES



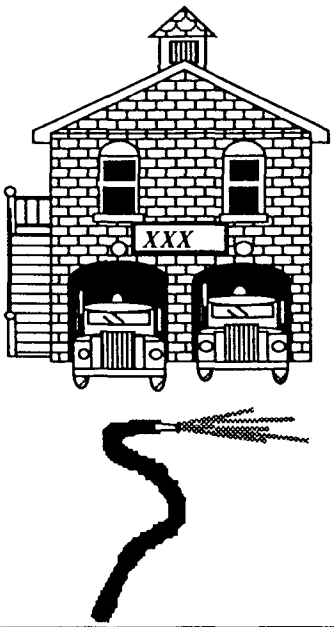
Under the law, EPA is required to treat Indian Tribal governments substantially the same as States. This means that if a Tribe is federally recognized, it may lead a response or may provide support when EPA leads the activities. To be considered substantially equivalent to States, an Indian Tribe must have jurisdiction over a site listed in CERCLIS (EPA's data base of information on hazardous waste sites). Federally recognized Indian Tribes may not have to provide CERCLA Section 104 assurances in all cases. Currently, EPA provides for off-site disposal, and the decision of who will oversee the operation and maintenance of the remedy is made on a case-by-case basis.

THE ROLE OF LOCAL GOVERNMENTS



Local governments also play an important role during a Superfund cleanup. Although most local governments do not have the resources to conduct entire cleanups at hazardous waste sites, localities often provide important public safety measures during emergencies, and may receive some financial assistance under the Local Government Reimbursement (LGR) program (Section 123 of CERCLA, as amended).

The LGR program is intended to alleviate significant financial burden on local governments as a result of conducting temporary emergency measures in response to a hazardous substance threat, and offers assistance of up to $25,000 per response directly to local governments. Requirements for pursuing reimbursement under CERCLA Section 123 are found in EPA's Interim Final Rule

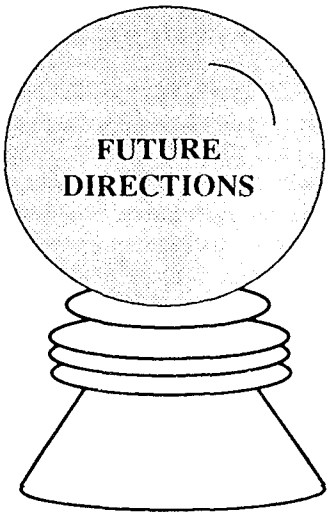


on Reimbursement to Local Governments for Emergency Response to Hazardous Substances Releases (40 CFR Part 310). In addition, EPA has prepared a fact sheet and application package that can be obtained by contacting EPA's RCRA/Superfund Hotline.

Local communities are important sources of information. Localities may be the first to identify a hazardous waste site by bringing it to the attention of State or Federal authorities. Communities can provide valuable details about a Superfund site, including information on the location of sites (site discovery), detail on site history (site investigation), and/or information on potentially responsible parties.

States often will coordinate with local officials to identify community concerns regarding a site cleanup. Throughout all cleanup actions, local officials are kept informed of plans and progress through telephone contacts or visits by EPA and State staff. Communities may also be asked to review and comment on important reports, studies, and proposed actions.

Whether a Federal-lead or State-lead managed response, to guarantee that local citizens are involved in decisions about cleanup actions in their communities, both EPA and the State conduct formal and informal community relations activities. Each NPL site designated for remedial response under Superfund must have an approved Community Relations Plan (CRP) in place before field activities can begin.



As the Superfund program continues to address the hazardous waste issue nationwide, State and local governments will assume an increasingly active role in confronting issues at Superfund sites. Some States have already developed their own State-wide cleanup program to address sites not included on EPA's National Priorities List.

In an effort to support State and local involvement in Superfund responses, EPA has taken several steps:

- Developed a new Subpart to the NCP, the roadmap to conducting responses under CERCLA. This Subpart outlines the requirements for State, local and Indian Tribal involvement in all phases of response.
- Published an administrative rule to complement the general procedures described in the NCP. This rule, Cooperative Agreements and Superfund State Contracts for Superfund Response Actions, can be found at 40 CFR Part 35 Subpart O.
- Developed a series of Directives, designated by the 9375.5 code, which is guidance relating to State, political subdivision, and federally recognized Indian Tribal involvement in the Superfund program.

The Agency also is encouraging States and local governments to participate in EPA-sponsored training programs.

FOR MORE INFORMATION

For more information on State and local involvement in the Superfund program, contact the RCRA/Superfund Hotline at 202-382-3000 or 1-800-424-9346. For a list of directives and publications or information on obtaining copies, contact the Superfund Docket & Information Center (SDIC) at 202-382-6940.

For more information on training opportunities for State and local governments and Indian Tribes, contact the Superfund Training Coordinator in EPA's Office of Solid Waste and Emergency Response at 202-382-4364.

Control of Air Emissions from Superfund Air Strippers at Superfund Groundwater Sites

9

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON D.C. 20460

JUN 15 1989

OSWER Directive 9355.0-28

MEMORANDUM

SUBJECT: Control of Air Emissions From Superfund Air Strippers at Superfund Groundwater Sites

FROM: Henry L. Longest II, Director
Office of Emergency and Remedial Response

Gerald Emison, Director
Office of Air Quality Planning and Standards

TO: Addressees

PURPOSE

This memorandum establishes guidance on the control of air emissions from air strippers used at Superfund sites for groundwater treatment and establishes procedures for implementation. Under this guidance, Regions should continue to make air emission control decisions on a case-by-case basis using the nine remedy selection criteria and the remedy selection process set forth in the proposed National Contingency Plan (NCP). As described below, however, the evaluation and weighing of the criteria in a "to be considered" (TBC) context will differ according to the air quality status of the site's location.

BACKGROUND

Approximately 35% of the Records of Decision (RODs) signed to date have involved sites which use a pump and treat technique to either partially or fully remediate groundwater contamination. Close to 45% of these pump and treat sites have selected air stripping. For the foreseeable future, OERR expects to use air stripping at about the same rate. This treatment technique relies on volatilization to remove volatile organic compounds (VOCs) from the groundwater, i.e. it transfers the contaminants from the liquid to vapor phase. One known side effect of air stripping is the emission of VOCs, many of which

are toxic, to the ambient air. The Superfund Program uses control devices such as vapor phase carbon adsorption and incineration to control these emissions.

In response to a request from Regional Air Division Directors for a policy to guide the selection of controls for air strippers, OERR and OAQPS conducted a joint study. The results showed that historically close to half of the Superfund air stripper sites had adopted controls during remedy selection. Another 25 percent deferred the decision to the remedial design phase. At sites with RODs signed after the enactment of the Superfund Amendments and Reauthorization Act, approximately two-thirds of the air strippers are controlled. At these sites, control decisions were based on an analysis of the cleanup standards established in Section 121 of CERCLA and the other statutory considerations which together comprise the nine remedy selection criteria: overall protection of human health and the environment; compliance with Applicable or Relevant and Appropriate Requirements (ARARs); long-term effectiveness/permanence; reduction of mobility, toxicity or volume (MTV); short-term effectiveness; implementability; cost; State acceptance; and community acceptance. Control decisions to date have been driven largely by protectiveness and State ARARs for both air toxics control and VOC control for ozone reduction. Other criteria such as MTV, short-term effectiveness, cost, and community acceptance, have also influenced the inclusion of controls.

Despite the trend towards increased control of air emissions from Superfund air strippers, the Agency remains concerned with the control of these air emissions. This concern underlies the vigorous efforts by EPA, States, localities, and industry across the country to control air toxics and reduce VOCs in ozone nonattainment areas. The adoption of this policy responds to these concerns, reflects an overall Agency concern with preventing the cross-media transfer of pollutants, and recognizes that the number of Federal, State, and local ARARs for both VOCs and air toxics appears to be rapidly increasing.

The following policy has been adopted to guide Regional decisionmakers on the use of controls for air emissions from Superfund air strippers, and other vented Superfund sources of VOCs. This policy is grounded in the remedy selection process and distinguishes between sites located in attainment and nonattainment areas.

STATEMENT OF POLICY

For sites located in areas that are attaining the National Ambient Air Quality Standards for ozone, Regions should continue applying controls based on existing Agency policy. In most cases, this will mean the adoption of controls largely in response to State ARARs, risk management (i.e., protectiveness) guidelines, and other requirements of CERCLA Section 121.

In ozone nonattainment areas, however, the adoption of controls is more likely to be indicated even if they are not mandated by current Federal or State laws and regulations or indicated by a cancer risk analysis. Aside from cancer risk from air toxics, VOC emissions contribute to non-cancer health risks in nonattainment areas because most are precursors to the formation of ozone. Consideration of these non-cancer risks when applying the remedy selection criteria generally will show that in nonattainment areas Superfund air strippers, except those with the lowest emissions rates as indicated below, generally merit controls. In determining the need for air stripper controls at a particular Superfund site in a nonattainment area, the Regions should be guided by the emissions limit goals in the document entitled, "Issues Relating to VOC Regulation Cutpoints, Deficiencies, and Deviations," issued in May 1988 by the Office of Air Quality Planning and Standards (OAQPS) to aid States in revising their State Implementation Plans (SIPs) to incorporate post-1987 ozone attainment strategies. The OAQPS guidance indicates that the sources most in need of controls are those with an actual emissions rate in excess of 3 pounds per hour (lb/hr) or 15 lb/day or a potential (i.e., calculated) rate of 10 tons per year (TPY) of total VOCs. The calculated rate assumes 24-hour operation, 365 days per year. Regions should note that control levels are applied on a facility basis. For the purposes of this guidance, facility is defined as a contiguous piece of property under common ownership.

This guidance applies to air strippers at Superfund sites. In establishing the policy, however, the potential for applicability to other VOC sources is recognized. Generally, the guidelines described for air strippers are suitable for VOC air emissions from other vented extraction techniques (e.g., soil vapor extraction) but not from area sources (e.g., soil excavation).

This guidance applies to future remedial decisions at Superfund sites. The policy is not explicitly designed for

actions taken by the removal program in the case of emergency or time critical removal actions. However, where time and other response circumstances permit, such as for non-time critical actions, adherence to this policy is expected.

The control levels referred to above serve as guidelines only if ARARs do not exist or are less stringent than presented here. They are not intended to preclude or replace State proposals for more stringent levels of control in pursuit of Clean Air Act goals as part of SIP revisions in nonattainment areas.

IMPLEMENTATION

This guidance seeks to incorporate air quality concerns into the Superfund remedy selection process. In particular, the use of controls for Superfund air strippers in nonattainment areas demonstrates the Agency's commitment to reducing VOCs and thus progressing toward attainment of the ozone standard. Additionally, the guidance is consistent with both the current NCP and proposed revisions. Where ARARs do not exist, EPA may consider TBCs in setting target cleanup levels. This guidance constitutes a TBC.

The Remedial Investigation/Feasibility Study (RI/FS) should generate the data needed to support control decisions for both attainment and nonattainment areas. At a minimum, the five major types of information needed are:

- Estimated cumulative uncontrolled air emissions rate from all air strippers at the site
- Consideration of health risks from the execution of the remedy as well as from the uncontrolled site
- Control alternatives and their costs
- Ozone attainment status
- Air ARARs

For purposes of this guidance "nonattainment area" means any county included in a formal post-1987 ozone SIP deficiency notification (SIP call) or any other county where the ozone National Ambient Air Quality Standard was exceeded during the previous three-year period. EPA's initial SIP calls were issued pursuant to Section 110(a)(2)(H) of the Clean Air Act and were described in the September 7, 1988 Federal Register.

The RI/FS scoping phase and work plan development should describe the specific data to be generated and the methods for doing so. Remedial Project Managers should consult with the designated Air Superfund Coordinator for technical assistance. Additional assistance is available from National Technical Guidance Manuals developed jointly by the Air and Superfund program offices for estimating air emissions and conducting air pathway analyses. The ROD should summarize this information as appropriate and clearly document the basis for the air emissions control decision.

Addressees:
Regional Waste Management Division Directors
Regional Superfund Branch Chiefs
Regional Air Division Directors
Regional Air Branch Chiefs
OERR Division Directors
OAQPS Division Directors

Indian Tribal Involvement in the Superfund Program

10

United States Environmental Protection Agency
Office of Solid Waste and Emergency Response
Publication No. 9375.5-02/FS
Fall 1989

EPA Indian Tribal Involvement In The Superfund Program

Office of Emergency and Remedial Response
Hazardous Site Control Division (OS-220)
Quick Reference Fact Sheet

INTRODUCTION

Under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986, the U.S. Environmental Protection Agency (EPA) is required to treat Indian Tribal governments substantially the same as States and to ensure meaningful involvement by States, political subdivisions, and Indian Tribes. This fact sheet describes the specific requirements of CERCLA and the National Oil and Hazardous Substances Pollution Contingency Plan for Tribal involvement in the Superfund program.

CRITERIA FOR TREATMENT AS A STATE

Indian Tribes are treated essentially as States when they meet three criteria:

- Are federally recognized
- Have a Tribal governing body that is currently performing governmental functions to promote health, safety and welfare of the affected population or to protect the environment within a defined geographic area
- Have jurisdiction over a site that is listed in CERCLIS (EPA's data base of information on hazardous waste sites), or have jurisdiction over a site that is proposed or listed on the National Priorities List (EPA's list of the nation's most serious hazardous waste sites), at which a Fund-financed response is contemplated.

DETERMINATION OF "FEDERALLY RECOGNIZED"

Section 101(36) of CERCLA defines an Indian Tribe to be "any Indian Tribe, band, nation, or other organized group or community, including any Alaskan Native village but not including any Alaskan Native regional or village corporation, which is recognized as eligible for the special programs and services provided by the United States to Indians because of their status as Indians." The Bureau of Indian Affairs (BIA) establishes criteria to determine whether an Indian Tribe is federally recognized and publishes a list of these Tribes in the Federal Register annually.

In some instances, a Tribe that has been federally recognized may not yet have been added to the published BIA list. To verify the status of a Tribe, more recent information can be obtained from the Branch of Acknowledgment and Research, BIA Headquarters, Washington, D.C., (202)343-1710.

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OPPORTUNITIES FOR TRIBAL INVOLVEMENT

Federally recognized Indian Tribes may participate in Superfund response as either a lead or support agency for Fund-financed activities during each phase of response. Indian Tribes may obtain funds for both lead and support agency involvement through a Superfund Cooperative Agreement. In addition, Tribes may seek funding for non-site-specific activities that facilitate their involvement in the Superfund program through a Core Program Cooperative Agreement.

CERCLA, as amended, prohibits EPA from undertaking a remedial action unless a State makes certain assurances or guarantees, including paying for part of the cleanup, ensuring disposal capacity, and conducting operation and maintenance of the remedy. Federally recognized Indian Tribes may not have to provide these CERCLA Section 104 assurances in all cases. In many cases, EPA provides the required assurances for the Indian Tribes.

EPA retains primary enforcement authority under CERCLA for sites within the jurisdiction of States, political subdivisions, and Indian Tribes. Indian Tribal governments are afforded the opportunity similar to States to participate in EPA negotiations with responsible parties for actions relating to, or directly impacting, land under Tribal jurisdiction. If a Tribal government participates in negotiations, it may become a signatory.

FOR MORE INFORMATION

EPA has developed a series of documents describing opportunities and requirements for Tribal involvement. These include:

- Subpart F of the NCP, which outlines the requirements for State, local, and Indian Tribal involvement as lead or support agency in all phases of Superfund response
- 40 CFR Part 35 Subpart O, which describes administrative procedures for entering into "Cooperative Agreements and Superfund State Contracts for Superfund Response"
- "Hazardous Waste Releases on Indian Land: Beginning the Superfund Process" (EPA/540/8-89/001), which is a handbook to assist Tribes in dealing with releases
- OSWER directives in the 9375.5 series, which pertain to State, political subdivision, and federally recognized Indian Tribal involvement in the Superfund program.

For a complete list of EPA directives and publications on Indian Tribal involvement in the Superfund program or information on obtaining copies, contact the Superfund Docket and Information Center at (202)382-3046. Further information on Indian Tribal involvement in the Superfund program can be obtained from the RCRA/ Superfund Hotline at (202)382-3000 or (800)424-9346.

Interim Guidance on Establishing Soil Lead Cleanup Levels at Superfund Sites

11

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

OFFICE OF
SOLID WASTE AND EMERGENCY RESPONSE

SEP 7, 1989

OSWER Directive #9355.4-02

MEMORANDUM

SUBJECT: Interim Guidance on Establishing Soil Lead Cleanup Levels at Superfund Sites.

FROM: Henry L. Longest II, Director
Office of Emergency and Remedial Response

Bruce Diamond, Director
Office of Waste Programs Enforcement

TO: Directors, Waste Management Division, Regions I, II, IV, V, VII and VIII
Director, Emergency and Remedial Response Division, Region II
Directors, Hazardous Waste Management Division, Regions III and VI
Director, Toxic Waste Management Division, Region IX
Director, Hazardous Waste Division, Region X

PURPOSE

The purpose of this directive is to set forth an interim soil cleanup level for total lead, at 500 to 1000 ppm, which the Office of Emergency and Remedial Response and the Office of Waste Programs Enforcement consider protective for direct contact at residential settings. This range is to be used at both Fund-lead and Enforcement-lead CERCLA sites. Further guidance will be developed after the Agency has developed a verified Cancer Potency Factor and/or a Reference Dose for lead.

BACKGROUND

Lead is commonly found at hazardous waste sites and is a contaminant of concern at approximately one-third of the sites on the National Priorities List (NPL). Applicable or relevant and appropriate requirements (ARARs) are available to provide cleanup levels for lead in air and water but not in soil. The current

National Ambient Air Quality Standard for lead is 1.5 ug/m^3. While the existing Maximum Contaminant Level (MCL) for lead is 50 ppb, the Agency has proposed lowering the MCL for lead to 10 ppb at the tap and to 5 ppb at the treatment plant[1]. A Maximum Contaminant Level Goal (MCLG) for lead of zero was proposed in 1988[2]. At the present time, there are no Agency-verified toxicological values (Reference Dose and Cancer Potency Factor, ie., slope factor), that can be used to perform a risk assessment and to develop protective soil cleanup levels for lead.

Efforts are underway by the Agency to develop a Cancer Potency Factor (CPF) and Reference Dose (RfD), (or similar approach), for lead. Recently, the Science Advisory Board strongly suggested that the Human Health Assessment Group (HHAG) of the Office of Research and Development (ORD) develop a CPF for lead, which was designated by the Agency as a B2 carcinogen in 1988. The HHAG is in the process of selecting studies to derive such a level. The level and documentation package will then be sent to the Agency's Carcinogen Risk Assessment Verification Exercise (CRAVE) workgroup for verification. It is expected that the documentation package will be sent to CRAVE by the end of 1989. The Office of Emergency and Remedial Response, the Office of Waste Programs Enforcement and other Agency programs are working with ORD in conjunction with the Office of Air Quality Planning and Standards (OAQPS) to develop an RfD, (or similar approach), for lead. The Office of Research and Development and OAQPS will develop a level to protect the most sensitive populations, namely young children and pregnant women, and submit a documentation package to the Reference Dose workgroup for verification. It is anticipated that the documentation package will be available for review by the fall of 1989.

IMPLEMENTATION

The following guidance is to be implemented for remedial actions until further guidance can be developed based on an Agency verified Cancer Potency Factor and/or Reference Dose for lead.

Guidance

This guidance adopts the recommendation contained in the 1985 Centers for Disease Control (CDC) statement on childhood lead poisoning[3] and is to be followed when the current or predicted land use is residential. The CDC recommendation states that "...lead in soil and dust appears to be responsible for blood levels in children increasing above background levels when the concentration in the soil or dust exceeds 500 to 1000 ppm". Site-specific conditions may warrant the use of soil cleanup levels below the 500 ppm level or somewhat above the 1000 ppm level. The administrative record should include background documents on the toxicology of lead and information related to site-specific conditions.

The range of 500 to 1000 ppm refers to levels for total lead, as measured by protocols developed by the Superfund Contract Laboratory Program. Issues have been raised concerning the role that the bioavailability of lead in various chemical forms and particle sizes should play in assessing the health risks posed by exposure to lead in soil. At this time, the Agency has not developed a position regarding the bioavailability issue and believes that additional information is needed to develop a position. This guidance may be revised as additional information becomes available regarding the bioavailability of lead in soil.

Blood-lead testing should not be used as the sole criterion for evaluating the need for long-term remedial action at sites that do not already have an extensive, long-term blood-lead data base[1].

EFFECTIVE DATE OF THIS GUIDANCE

This interim guidance shall take effect immediately. The guidance does not require that cleanup levels already entered into Records of Decisions, prior to this date, be revised to conform with this guidance.

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[1] In one case, a biokinetic uptake model developed by the Office of Air Quality Planning and Standards was used for a site-specific risk assessment. This approach was reviewed and approved by Headquarters for use at the site, based on the adequacy of data (due to continuing CDC studies conducted over many years). These data included all children's blood-lead levels collected over a period of several years, as well as family socio-economic status, dietary conditions, conditions of homes and extensive environmental lead data, also collected over several years. This amount of data allowed the Agency to use the model without a need for extensive default values. Use of the model thus allowed a more precise calculation of the level of cleanup needed to reduce risk to children based on the amount of contamination from all other sources, and the effect of contamination levels on blood-lead levels of children.

REFERENCES

1. 53 FR 31516, August 18, 1988.
2. 53 FR 31521, August 18, 1988.
3. Preventing Lead Poisoning in Young Children, January U.S. Department of Health and Human Services, Center Disease Control, 99-2230.

Risk Assesment Guidance for Superfund:
Volume I
Human Health Evaluation Manual

12

United States
Environmental Protection
Agency

Office of Solid Waste and
Emergency Response
Washington, D.C. 20460

9285.7-01/FS
April 1990

EPA

Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part A)

Office of Emergency and Remedial Response
Hazardous Site Evaluation Division, OS-230

Quick Reference Fact Sheet

The overarching mandate of the Superfund program is to protect human health and the environment from current and potential threats posed by uncontrolled releases of hazardous substances. To help meet this mandate, the U.S. Environmental Protection Agency's (EPA's) Office of Emergency and Remedial Response (OERR) has developed a human health evaluation process as part of its remedial response program. EPA's *Human Health Evaluation Manual* describes the process of gathering information and assessing the risk to human health, and together with the *Environmental Evaluation Manual* comprise a two-volume set (Volumes I and II, respectively) called *Risk Assessment Guidance for Superfund* (RAGS). RAGS replaces two previous EPA guidance documents: the *Superfund Public Health Evaluation Manual* (SPHEM; 1986) and the *Draft Endangerment Assessment Handbook* (1985).

The *Human Health Evaluation Manual* has three main parts: baseline risk assessment (Part A), refinement of preliminary remediation goals (Part B), and risk evaluation of remedial alternatives (Part C). Part A of this manual is being distributed as an Interim Final document. Remedial project managers (RPMs) should ensure that the procedures in this guidance be used for all new human health risk assessments conducted as part of the remedial investigation/feasibility study (RI/FS) process. Copies of Part A can be obtained by calling EPA's Center for Environmental Research Information at 513-569-7562 (FTS 684-7562). Parts B and C are targeted for completion in 1990.

This fact sheet is designed to alert RPMs and other personnel to (1) new aspects of the *Human Health Evaluation Manual* (Part A), (2) the purpose and steps of the baseline risk assessment, and (3) where additional help can be obtained.

PURPOSE OF THE HUMAN HEALTH EVALUATION

The human health evaluation is used in the Superfund program to:

- help identify which sites warrant remedial action;
- provide a consistent process for evaluating and documenting human health risk;
- ensure protectiveness by the refinement of risk-based, site-specific remediation goals;
- provide focus for the FS;
- help to measure the effectiveness of remedial alternatives; and
- aid in priority setting for remedial design/ remedial action.

HUMAN HEALTH EVALUATION IN THE RI/FS PROCESS

The RI/FS is the methodology that the Superfund program has established for characterizing the nature and extent of risks posed by uncontrolled hazardous waste sites and for developing and evaluating remedial options. The Superfund Amendments and Reauthorization Act of 1986 reemphasized the original statutory mandate that remedies meet the threshold requirement to protect human health and the environment. Because the RI/FS is an analytical process designed to support risk management decision-making, the assessment of health and environmental risk plays an essential role in the RI/FS. Highlight 1 shows the stages of the RI/FS, relating health risk evaluation activities to each stage. Although the RI/FS process and related risk evaluation activities are presented in a fashion that makes the steps appear sequential and distinct, in practice the steps are usually highly interactive.

HUMAN HEALTH EVALUATION AND ENDANGERMENT FINDINGS

One of EPA's goals in the Superfund program is to use more CERCLA section 106 (i.e., imminent and substantial endangerment) orders to compel potentially responsible parties to design and conduct the remedial actions. In order for EPA to issue and enforce a section 106 order, the baseline risk assessment must be sufficient to support the finding that there may be an imminent and substantial endangerment to public health or welfare or the environment because of an actual or threatened release of a hazardous substance. By requiring careful adherence to the *Human Health Evaluation Manual* (together with the *Environmental Evaluation Manual*), the resulting baseline risk assessment should be adequate to support an endangerment finding and thus a CERCLA section 106 order.

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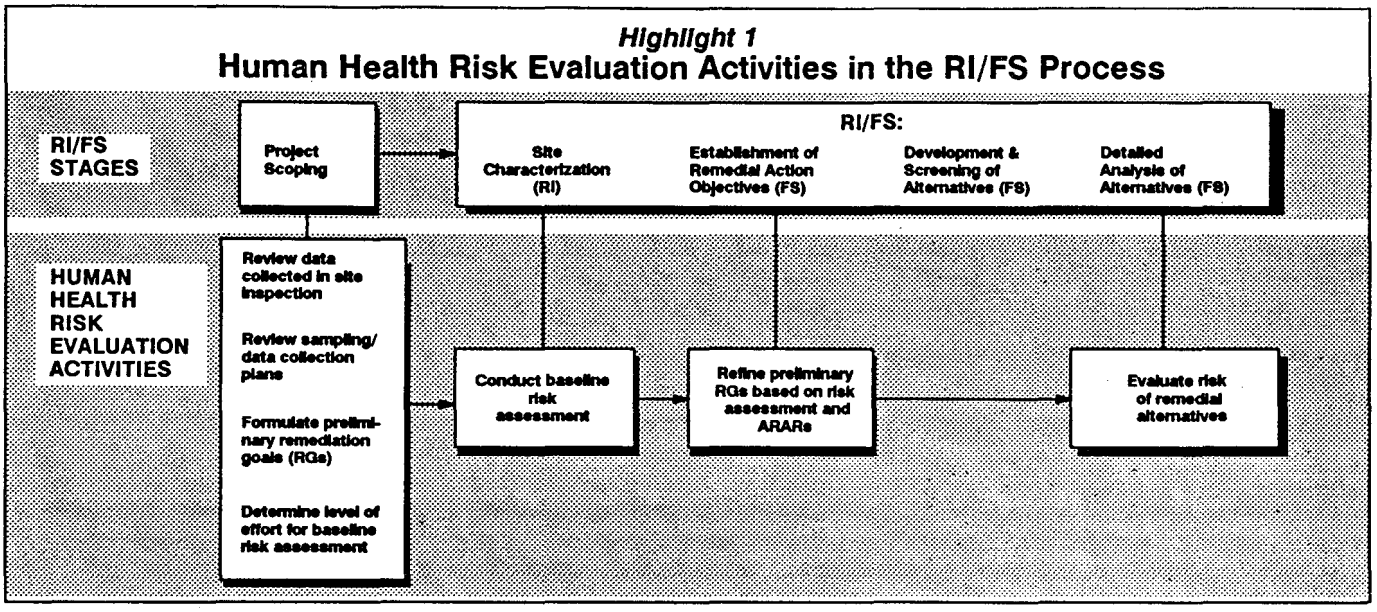


PART A OF THE MANUAL: BASELINE RISK ASSESSMENT

The baseline risk assessment process described in Part A of the manual consists of four main steps as shown in Highlight 2. Relevant information identified through data collection and evaluation (Step 1) is used to develop exposure and toxicity assessments (Steps 2 and 3). Risk characterization (Step 4) summarizes and integrates both the toxicity and exposure steps into quantitative and qualitative expressions of risk.

WHAT'S NEW IN THE MANUAL

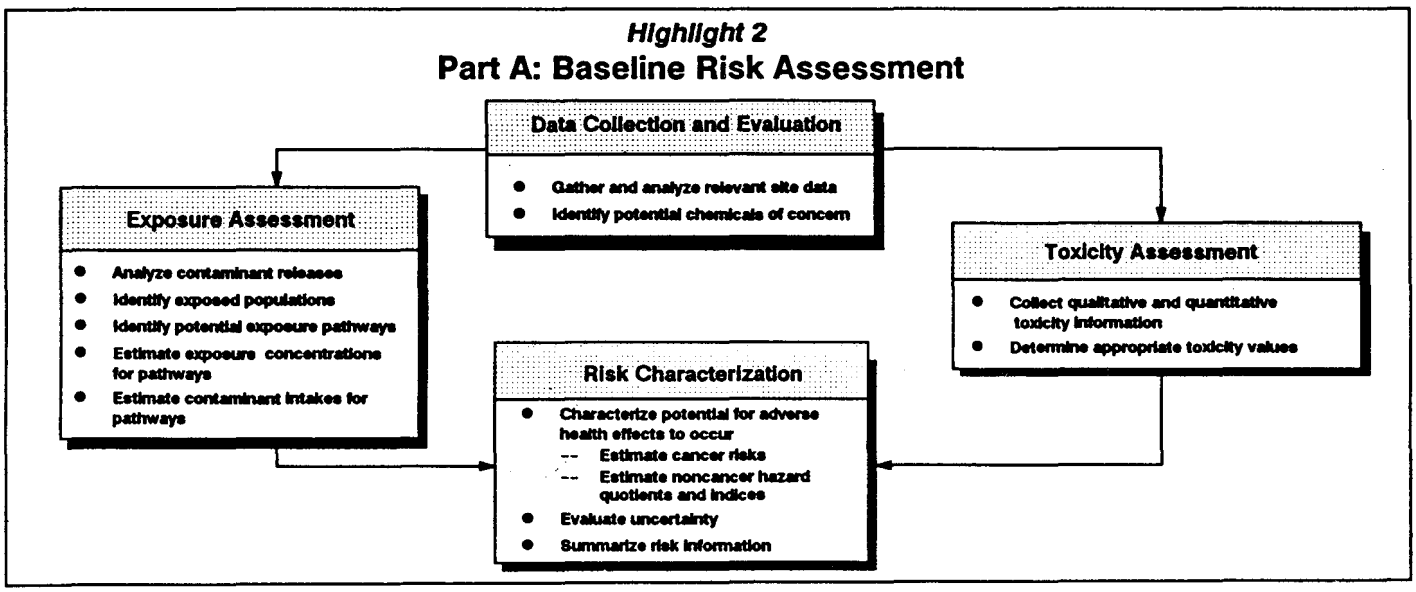
The *Human Health Evaluation Manual* revises and builds upon the health evaluation process established in SPHEM. Provided are new information and techniques gleaned from several years of program experience conducting risk assessments at hazardous waste sites. Policies established and evolved over the years — including those resulting from the revised National Oil and Hazardous Substances Pollution Contingency Plan (NCP) — have been updated and clarified. In addition, the link between the human health evaluation, the environmental evaluation, and the RI/FS has been strengthened.

HIGHLIGHTS OF THE REVISION

Introduction. Emphasizes shift in NCP and RI/FS philosophy toward efficiency, effectiveness, and a bias for action.

Data Collection (new chapter). Encourages assessors' early involvement in RI/FS planning and effective communication with RPMs. Describes procedures for acquiring reliable chemical release and exposure data for quantitative assessment. The topics discussed in the Data Collection chapter are shown in Highlight 3.

Data Evaluation (new chapter). Provides nine steps to organize data and to identify a set of chemicals and concentrations that are of acceptable quality for use in the quantitative risk assessment. The nine data evaluation steps are shown in Highlight 4.



Highlight 3
Topics Discussed in Data Collection Chapter

- **Available site information**
- **Modeling parameter needs**
- **Background sampling needs**
- **Preliminary identification of human exposure**
- **Overall strategy for sample collection**
- **Need for Special Analytical Services**
- **Activities during workplan development and data collection**

Highlight 4
Data Evaluation Steps

Step 1: **Gather all data available from the site investigation and sort by medium.**
Step 2: **Evaluate the analytical methods used.**
Step 3: **Evaluate the quality of data with respect to sample quantitation limits.**
Step 4: **Evaluate the quality of data with respect to qualifiers and codes.**
Step 5: **Evaluate the quality of data with respect to blanks.**
Step 6: **Evaluate tentatively identified compounds.**
Step 7: **Compare potential site-related contamination with background.**
Step 8: **Develop a set of data for use in the risk assessment.**
Step 9: **If appropriate, further limit the number of chemicals to be carried through the risk assessment.**

Exposure Assessment. Gives specific equations and parameter values for common Superfund site exposure pathways. Defines the revised NCP's reasonable maximum exposure (RME) concept under both current and future land-use conditions. Highlight 5 defines the RME and describes the specific terms in the general exposure equation used to generate the RME.

Toxicity Assessment. Discusses EPA guidances, toxicity data bases, and Superfund technical assistance groups. Provides updated discussion of EPA's toxicity assessment methods. Defines hierarchy of toxicity data sources, as shown in Highlight 6.

Risk Characterization. Provides guidance for summarizing risk information for use in decision-making. Presents expanded discussion of uncertainty. Includes examples of helpful visual presentations of risk assessment as shown in Highlights 7 and 8.

Documentation, Review, and Management Tools (new chapter). Presents new tools for the RPM, risk assessor, and risk assessment reviewer. These new tools are described in Highlight 9. They include an RPM involvement checklist (see Highlight 10), recommended format for a baseline risk assessment report, and a risk assessment reviewer's checklist.

Highlight 5
Reasonable Maximum Exposure (RME)

The **reasonable maximum exposure (RME)** is defined as the highest exposure that could reasonably be expected to occur at a site. RME is calculated using the following general equation,

$$I = C \times \frac{CR \times EFD}{BW} \times \frac{1}{AT}$$

where:

I = Intake; the amount of chemical at the exchange boundary (mg/kg body weight- dy).

C = Concentration; the average chemical concentration contacted over the exposure period (e.g., mg/l).

CR = Contact Rate; the amount of contaminated medium (e.g., soil, air, water) contacted per unit time or event (e.g., l/dy).

EFD = Exposure Frequency and Duration; how often and how long exposure occurs (e.g., dy/yr, yr).

BW = Body Weight; the average body weight over the exposure period (kg).

AT = Averaging Time; the time period over which exposure is averaged (dy).

Use a 95th upper confidence limit on the arithmetic mean concentration contacted over the exposure period, rather than the mean itself. Rationale: uncertainty in the measurements or modeling will be quantitatively considered.

Use the 95th percentile intake rate. Rationale: this will be protective of most of the population.

Use the 95th percentile estimate if available, or best professional judgment to estimate a conservative value. Rationale: statistical data on these terms are rarely available; a conservative estimate is suggested rather than a best or average estimate in order to be protective.

Use the arithmetic average body weight over the exposure period. Rationale: body weight is not always independent of intake; by using the average, error from this dependence is minimized; using the average rather than the 5th percentile body weight will also reduce the number of upper-bound values that are multiplied together.

Highlight 6

Hierarchy of Toxicity Data Sources

Integrated Risk Information System (IRIS)

- Provides verified reference doses (RfDs) and slope factors
- Updated monthly
- EPA's preferred source of toxicity information

Health Effects Assessment Summary Tables (HEAST)

- Provides interim as well as verified RfDs and slope factors
- Should be used only for chemicals not addressed in IRIS

Other EPA References

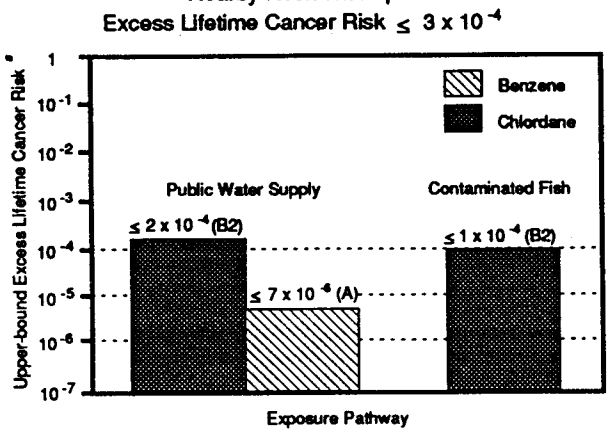
- Do not necessarily provide verified RfDs and slope factors
- Should be used only for chemicals not found or referenced in IRIS or HEAST
- EPA's Environmental Criteria and Assessment Office must be contacted first (513-569-7300; FTS 684-7300)

Radiation Risk Assessment Guidance (new chapter). Provides basic principles and concepts of radiation protection and supplemental baseline risk assessment guidance for use at sites contaminated with radioactive substances.

Appendices (new). Provide technical information on absorbed vs. administered dose, and a complete index for quick reference.

Highlight 7

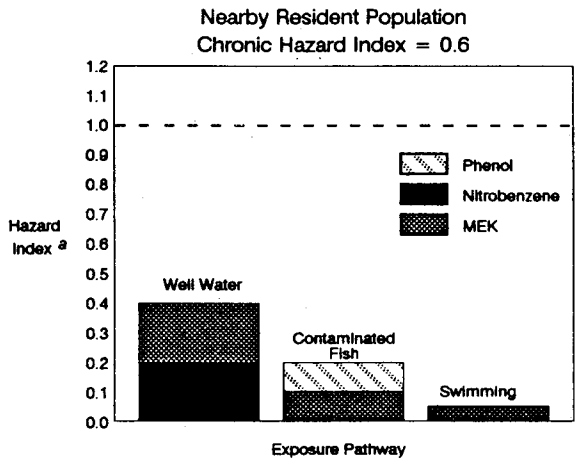
Example of Presentation of Relative Contribution of Individual Chemicals to Exposure Pathway and Total Cancer Risk Estimates



[a] The risk of developing cancer is plotted on a log scale. A risk of 10^{-4} indicates a probability of 1 chance in 10,000 of an individual developing cancer. Risks of 10^{-5} and 10^{-6} correspond to probabilities of 1 chance in 100,000 and 1 chance in 1,000,000, respectively. Values in parentheses represent EPA's weight-of-evidence classification of the agent as a potential human carcinogen: A = human carcinogen; and B2 = probable human carcinogen (with sufficient evidence in animals and inadequate or no evidence in humans).

Highlight 8

Example of Presentation of Relative Contribution of Individual Chemicals to Exposure Pathway and Total Hazard Index Estimates



[a] The hazard index is equal to the sum of the hazard quotients (i.e., exposure level/RfD) for each chemical. It is not a probability; a hazard index or quotient of ≤1.0 indicates that it is unlikely for even sensitive human populations to experience adverse health effects.

NEED MORE HELP?

Superfund Health Risk Assessment Technical Support Center. This center provides program staff and their contractors access to the Office of Health and Environmental Assessment (OHEA) and other Agency experts in the area of health risk assessment. The center is coordinated by OHEA's Environmental Criteria and Assessment Office in Cincinnati (513-569-7300 or FTS 684-7300); it offers technical guidance in all areas of health risk assessment, including project scoping, sampling methods, exposure assessment, toxicity assessment, and risk characterization. ECAO may respond to questions directly or refer callers to other OHEA or Agency offices. In addition, callers may be referred initially to regional Toxics Integration Coordinators for responses to site-specific requests (see next section).

Highlight 9

New Documentation, Review, and Management Tools

- **RPM Involvement Checklist (see Highlight 10).** The checklist addresses risk information needs and includes pointers on planning and involvement for the RPM. Involvement of managers in the direction and development of the risk assessment helps to avoid serious mistakes or costly misdirections in focus or level of effort.
- **Recommended Format for a Baseline Risk Assessment Report.** Consistency of Superfund risk assessment format encourages completeness, consistent use of results, and allows for easier review.
- **Risk Assessment Reviewer's Checklist.** The checklist is intended as a guide to ensure that critical issues concerning the quality and adequacy of risk information are not overlooked.

Highlight 10

Checklist for RPM Involvement

1. Getting Organized

   - Ensure that the workplan for the risk assessment contractor support is in place (if needed).
   - Identify EPA risk assessment support personnel (to be used throughout the risk assessment process).
   - Gather relevant information, such as appropriate guidances and site-specific data and reports.
   - Identify available state, county, and other non-EPA resources.
   - Prior to Special Notice, determine whether the PRPs will be allowed to do the risk assessment.

2. Before the Scoping Meeting

   - Make initial contact with risk assessor.
   - Provide risk assessor with available guidances and site data.
   - Determine (or review) data collection needs for risk assessment, considering:
     - -- modeling parameter needs;
     - -- type and location of background samples;
     - -- alternate future land use;
     - -- possible exposure scenarios;
     - -- location(s) in ground water that will be used to evaluate future ground-water exposures;
     - -- the preliminary identification of environmental concerns;
     - -- strategies (including medium and location) for sample collection appropriate to site/risk assessment needs;
     - -- statistical methods;
     - -- QA/QC measures of particular importance to risk assessment; and
     - -- special analytical services needs.

3. At the Scoping Meeting

   - Present risk assessment data collection needs.
   - Ensure that the risk assessment data collection needs will be considered in development of the sampling and analysis plan.
   - Where limited resources require that less-than-optimal sampling be conducted, discuss potential impacts on risk assessment results.

4. After the Scoping Meeting

   - Ensure that the risk assessor reviews and approves the sampling and analysis plan.
   - Consult with the Agency for Toxic Substances and Disease Registry (ATSDR) if human monitoring is planned.

5. During Sampling and Analysis

   - Ensure that risk assessment needs are being met during sampling.
   - Provide risk assessor with any preliminary sampling results so that he/she can determine if sampling should be refocused.
   - Consult with ATSDR to obtain a status report on any human monitoring that is being conducted. Provide any results to risk assessor.

6. During Development of Risk Assessment

   - Meet with risk assessor to discuss basis for excluding chemicals from the risk assessment (and developing the list of chemicals of potential concern). Confirm appropriateness of excluding chemicals.
   - Confirm determination of alternate future land use.
   - Confirm location(s) in ground water that will be used to evaluate future ground-water exposures.
   - Understand basis for selection of pathways and potentially exposed populations.
   - Facilitate discussions between risk assessor and EPA risk assessment support personnel on the following points:
     - -- the use of any major exposure, fate, and transport models (e.g., air or ground-water dispersion models);
     - -- site-specific exposure assumptions;
     - -- non-EPA-derived toxicity values; and
     - -- appropriate level of detail for uncertainty analysis, and the degree to which uncertainties will be quantified.
   - Discuss and approve combination of pathway risks and hazard indices.
   - Ensure that results of risk characterization have been compared with ATSDR health assessments and any site-specific human studies that might be available.

7. Reviewing the Risk Assessment

   - Allow sufficient time for review and incorporation of comments.
   - Ensure that reviewers' comments are addressed.

8. Communicating the Risk Assessment

   - Plan a briefing among technical staff to discuss significant findings and uncertainties.
   - Discuss development of graphics, tools, and presentations to assist risk management decisions.
   - Consult with other groups (e.g., community relations staff), as appropriate.
   - Brief upper management.

Regional Toxics Integration Coordinators and Headquarters Contacts. Superfund Toxics Integration Coordinators are located in each region. Questions regarding site-specific Superfund risk assessment issues should be referred to the appropriate individuals listed in Highlight 11. The Toxics Integration Branch, OERR, may be contacted at 202-475-9486 (FTS 475-9486) for technical information sources, availability of guidances, and related program directives.

Highlight 11

Regional Toxics Integration Coordinators

Region	Name and Address	Phone Number
I	Sarah Levinson Waste Management Division (HSS-CAN-7) EPA Region I John F. Kennedy Federal Building Boston, MA 02203	FTS 833-1504 617-223-5504
II	Peter Grevatt Program Support Branch ERR Division EPA Region II 26 Federal Plaza New York, NY 10278	FTS 264-8775 212-264-6323
III	Richard Brunker Hazardous Waste Management Division (3HW15) EPA Region III 841 Chestnut Street Philadelphia, PA 19107	FTS 597-0804 215-597-0804
IV	Elmer Akin Waste Management Division EPA Region IV 345 Courtland Street, NE Atlanta, GA 30365	FTS 257-1586 404-347-1586
V	Steve Ostrodka Technical Support Unit (5HSM-12) EPA Region V 230 South Dearborn Street Chicago, IL 60604	FTS 886-3011 312-886-3011
VI	Jon Rauscher EPA Region VI (6H-SR) First Interstate Bank Tower 1445 Ross Avenue Dallas, TX 75202-2733	FTS 255-2198 214-655-2198
VII	Superfund Branch EPA Region VII 726 Minnesota Avenue Kansas City, KS 66101	FTS 236-7052* 913-551-7052
VIII	Chris Weis EPA Region VIII (8HWM-SR) 999 18th Street, Suite 500 Denver, CO 80202-2405	FTS 330-7655 303-294-7655
IX	Gerald Hiatt Technical Support Section (H-8-4) Superfund Program EPA Region IX 1235 Mission Street San Francisco, CA 94103	FTS 484-1914 415-744-1914
X	Pat Cirone EPA Region X (ES-098) 1200 Sixth Avenue Seattle, WA 98101	FTS 399-1597 206-442-1597

* Caller must have FTS 2000. If not, use commercial number.

Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions

13

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

APR 22 1991

OFFICE OF
SOLID WASTE AND EMERGENCY RESPONSE

OSWER DIRECTIVE 9355.0-30

MEMORANDUM

SUBJECT: Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions

FROM: Don R. Clay
Assistant Administrator

TO: Directors, Waste Management Division
Regions I, IV, V, VII, VIII
Director, Emergency and Remedial Response Division
Region II
Directors, Hazardous Waste Management Division
Regions III, VI, IX
Director, Hazardous Waste Division,
Region X

Purpose

The purpose of this memorandum is to clarify the role of the baseline risk assessment in developing Superfund remedial alternatives and supporting risk management decisions.

Specifically, the following points are made in the memorandum:

- Where the cumulative carcinogenic site risk to an individual based on reasonable maximum exposure for both current and future land use is less than 10^{-4}, and the non-carcinogenic hazard quotient is less than 1, action generally is not warranted unless there are adverse environmental impacts. However, if MCLs or non-zero MCLGs are exceeded, action generally is warranted.

- Other chemical-specific ARARs may also be used to determine whether a site warrants remediation.

- A risk manager may also decide that a baseline risk level less than 10^{-4} is unacceptable due to site specific reasons and that remedial action is warranted.

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- Compliance with a chemical-specific ARAR generally will be considered protective even if it is outside the risk range (unless there are extenuating circumstances such as exposure to multiple contaminants or pathways of exposure).

- The upper boundary of the risk range is not a discrete line at 1×10^{-4}, although EPA generally uses 1×10^{-4} in making risk management decisions. A specific risk estimate around 10^{-4} may be considered acceptable if justified based on site-specific conditions.

- The ROD should clearly justify the use of any non-standard exposure factors and the need for remedial action if baseline risks are within the generally acceptable risk range. The ROD should also include a table listing the final remediation goals and the corresponding risk level for each chemical of concern.

Background

The 1990 National Contingency Plan (NCP) (55 Fed. Reg. 8665-8865 (Mar. 8, 1990)) calls for a site-specific baseline risk assessment to be conducted, as appropriate, as part of the remedial investigation (Section 300.430(d)(1)). Specifically, the NCP states that the baseline risk assessment should "characterize the current and potential threats to human health and the environment that may be posed by contaminants migrating to ground water or surface water, releasing to air, leaching through soil, remaining in the soil, and bioaccumulating in the food chain" (Section 300.430(d)(4)). The primary purpose of the baseline risk assessment is to provide risk managers with an understanding of the actual and potential risks to human health and the environment posed by the site and any uncertainties associated with the assessment. This information may be useful in determining whether a current or potential threat to human health or the environment exists that warrants remedial action.

The "Risk Assessment Guidance for Superfund: Volume I, Human Health Evaluation Manual - Part A" (HHEM) (EPA/540/1-89/002) provides guidance on how to conduct the human health portion of the baseline risk assessment. Volume II of the "Risk Assessment Guidance for Superfund" the "Environmental Evaluation Manual" (EPA/540/1-89/001) and the companion manual, "Ecological Assessment of Hazardous Waste Sites: A Field and Laboratory Reference" (EPA/600/3-89/013) provide guidance on conducting the environmental portion of the baseline risk assessment. Other pertinent guidance includes the "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA" (RI/FS guidance, EPA/540/G-89/004), which describes how the baseline risk assessment fits into the overall RI/FS process. "Guidance on Preparing Superfund Decision Documents" (ROD guidance)

(EPA/624/1-87/001) provides information on how to document the results of the baseline risk assessment in the ROD.

Objective

The objective of this memorandum is to provide further guidance on how to use the baseline risk assessment to make risk management decisions such as determining whether remedial action under CERCLA Sections 104 or 106 is necessary. This memorandum also clarifies the use of the baseline risk assessment in selecting appropriate remedies under CERCLA Section 121, promotes consistency in preparing site-specific risk assessments, and helps ensure that appropriate documentation from the baseline risk assessment is included in Superfund remedy selection documents.

Implementation

RISKS WARRANTING REMEDIAL ACTION

Whenever there is a release or substantial threat of release of a hazardous substance into the environment (or a release or threat of release into the environment of a pollutant or contaminant "which may present an imminent and substantial danger to public health or welfare"), Section 104(a)(1) of CERCLA provides EPA with the authority to take any response action consistent with the National Contingency Plan it deems necessary to protect public health or welfare or the environment. Section 106 of CERCLA grants EPA the authority to require potentially responsible parties (or others) to perform removal or remedial actions "when the President determines that there may be an imminent and substantial endangerment to the public health or welfare or the environment because of an actual or threatened release of a hazardous substance from a facility."

As a general policy and in order to operate a unified Superfund program, EPA generally uses the results of the baseline risk assessment to establish the basis for taking a remedial action using either Section 104 or 106 authority. EPA may use the results of the baseline risk assessments to determine whether a release or threatened release poses an unacceptable risk to human health or the environment that warrants remedial action and to determine if a site presents an imminent and substantial endangerment. The risk assessment methodology for all sites should be the same regardless of whether the RI/FS or remedial design and remedial action is performed by EPA or potentially responsible parties.

Generally, where the baseline risk assessment indicates that a cumulative site risk to an individual using reasonable maximum exposure assumptions for either current or future land use exceeds the 10^{-4} lifetime excess cancer risk end of the risk

range, action under CERCLA is generally warranted at the site. For sites where the cumulative site risk to an individual based on reasonable maximum exposure for both current and future land use is less than 10^{-4}, action generally is not warranted, but may be warranted if a chemical specific standard that defines acceptable risk is violated or unless there are noncarcinogenic effects or an adverse environmental impact that warrants action. A risk manager may also decide that a lower level of risk to human health is unacceptable and that remedial action is warranted where, for example, there are uncertainties in the risk assessment results. Records of Decision for remedial actions taken at sites posing risks within the 10^{-4} to 10^{-6} risk range must explain why remedial action is warranted.

The cumulative site baseline risk should include all media that the reasonable maximum exposure scenario indicates are appropriate to combine and should not assume that institutional controls or fences will account for risk reduction. For noncarcinogenic effects of toxicants, unacceptable risk occurs when exposures exceed levels which represent concentrations to which the human population, including sensitive subgroups, may be exposed without adverse effect during a lifetime or part of a lifetime, as appropriate to address teratogenic and developmental effects.

Chemical specific standards that define acceptable risk levels (e.g., non-zero MCLGs, MCLs) also may be used to determine whether an exposure is associated with an unacceptable risk to human health or the environment and whether remedial action under Section 104 or 106 is warranted. For ground water actions, MCLs and non-zero MCLGs will generally be used to gauge whether remedial action is warranted.

EPA uses the general 10^{-4} to 10^{-6} risk range as a "target range" within which the Agency strives to manage risks as part of a Superfund cleanup. Once a decision has been made to take an action, the Agency has expressed a preference for cleanups achieving the more protective end of the range (i.e., 10^{-6}), although waste management strategies achieving reductions in site risks anywhere within the risk range may be deemed acceptable by the EPA risk manager. Furthermore, the upper boundary of the risk range is not a discrete line at 1×10^{-4}, although EPA generally uses 1×10^{-4} in making risk management decisions. A specific risk estimate around 10^{-4} may be considered acceptable if justified based on site-specific conditions, including any remaining uncertainties on the nature and extent of contamination and associated risks. Therefore, in certain cases EPA may consider risk estimates slightly greater than 1×10^{-4} to be protective.

When an ARAR for a specific chemical (or in some cases a group of chemicals) defines an acceptable level of exposure,

compliance with the ARAR will generally be considered protective even if it is outside the risk range (unless there are extenuating circumstances such as exposure to multiple contaminants or pathways of exposure). Conversely, in certain situations EPA may determine that risks less than 1×10^{-4} are not sufficiently protective and warrant remedial action.

Where current conditions have not resulted in a release posing risks that warrant action but there is a significant possibility that a release will occur that is likely to result in an unacceptable risk, remedial action may also be taken. The significance of the potential future release may be evaluated in part based on the quantities of material at the site and the environmental setting.

RISKS CONSIDERED IN RISK MANAGEMENT DECISION

As noted above, both current and reasonably likely future risks need to be considered in order to demonstrate that a site does not present an unacceptable risk to human health and the environment. An adequate consideration of future risk may necessitate the assessment of risks assuming a land use different from that which currently exists at the site. The potential land use associated with the highest level of exposure and risk that can reasonably be expected to occur should be addressed in the baseline risk assessment. Further, this land use and these exposure assumptions should be used in developing remediation goals.

The preamble to the NCP states that EPA will consider future land use as residential in many cases. In general, residential areas should be assumed to remain residential; and undeveloped areas can be assumed to be residential in the future unless sites are in areas where residential land use is unreasonable. Often the exposure scenarios based on potential future residential land use provide the greatest risk estimates (e.g., reasonable maximum exposure scenario) and are important considerations in deciding whether to take action (55 Fed. Reg. at 8710).

However, the NCP also states that "the assumption of future residential land use may not be justifiable if the probability that the site will support residential use in the future is small." Sites that are surrounded by operating industrial facilities can be assumed to remain as industrial areas unless there is an indication that this is not appropriate. Other land uses, such as recreational or agricultural, may be used, if appropriate. When exposures based on reasonable future land use are used to estimate risk, the NCP preamble states that the ROD "should include a qualitative assessment of the likelihood that the assumed future land use will occur" (55 Fed. Reg. at 8710).

Unacceptable environmental risks also may prompt remedial action and may occur where there is no significant risk to human health. Threats or potential threats to sensitive habitats, such as wetlands, and critical habitats of species protected under the Endangered Species Act are especially important to consider when determining whether to take an action under CERCLA Section 104 or 106. Ambient Water Quality Criteria for aquatic organisms are chemical-specific standards that will generally be considered when determining whether to take an action based on the environmental risk of releases to surface waters.

NO-ACTION DECISIONS

If the baseline risk assessment and the comparison of exposure concentrations to chemical-specific standards indicates that there is no unacceptable risk to human health or the environment and that no remedial action is warranted, then the CERCLA Section 121 cleanup standards for selection of a Superfund remedy, including the requirement to meet applicable or relevant and appropriate requirements (ARARs), are not triggered. CERCLA section 121 (a) requires only that those remedial actions that are "determined to be necessary ... under section 104 or ... 106 ... be selected in accordance with section 121." If EPA determines that an action is necessary, the remedial action must attain ARARs, unless a waiver is invoked. Of course, sites that do not warrant action under CERCLA sections 104 or 106 may warrant action under another State or Federal statute, such as RCRA subtitle D requirements for the appropriate closure of a solid waste landfill.

The decision not to take action at an NPL site under section 104 and 106 should also be documented in a ROD. The decision documentation process should include the preparation of a proposed plan for public comment, ROD and eventually a closeout report and Federal Register deletion notice.

POINT OF DEPARTURE WHEN ACTION WARRANTED

Once remedial action has been determined to be warranted, the results of the baseline risk assessment may be used to modify preliminary remediation goals. These preliminary goals are developed at scoping based on ARARs and the 10^{-6} cancer risk point of departure pursuant to NCP section 300.430(e)(2)(i).

USE OF BASELINE RISK ASSESSMENT TO MODIFY PRELIMINARY REMEDIATION GOALS

Remediation goals developed under CERCLA Section 121 are generally medium-specific chemical concentrations that will pose no unacceptable threat to human health and the environment. Preliminary remediation goals are developed early in the RI/FS process based on ARARs and other readily available information,

such as concentrations associated with 10^{-6} cancer risk or a hazard quotient equal to one for noncarcinogens calculated from EPA toxicity information. These preliminary goals may be modified based on results of the baseline risk assessment, which clarifies exposure pathways and may identify situations where cumulative risk of multiple contaminants or multiple exposure pathways at the site indicate the need for more or less stringent cleanup levels than those initially developed as preliminary remediation goals. In addition to being modified based on the baseline risk assessment, preliminary remediation goals and the corresponding cleanup levels may also be modified based on the given waste management strategy selected at the time of remedy selection that is based on the balancing of the nine criteria used for remedy selection (55 Fed.Reg. at 8717 and 8718).

EARLY AND INTERIM ACTIONS

Early operable unit actions (e.g., hot spot removal and treatment) and interim actions (e.g., temporary storage or ground water plume containment) may be taken to respond to an immediate site threat or to take advantage of an opportunity to significantly reduce risk quickly (55 Fed. Reg. at 8705). For example, an interim containment action may be particularly useful early in the process for complicated ground water remedial actions, where concentrations greater than MCLs provide a good indication that remediation of a potential drinking water source is necessary; such quick remedial action is important to prevent further spread of the contaminant plume while a final ground water remedy is being developed.

Early and interim action RODs do not require a completed baseline risk assessment, although enough information must be available to demonstrate the potential for risk and the need to take action. Data sufficient to support the interim action decision can be extracted from the ongoing RI/FS for the site and set out in a focused feasibility study or other appropriate document that includes a short analysis of a limited number of alternatives (55 Fed. Reg. at 8704). These data should include a summary of contaminants of concern, concentrations and relevant exposure information. A discussion should accompany these data explaining the need for immediate remedial action based on the presence of contamination that, if left unaddressed in the short-term, either contributes immediate risk or is likely to contribute to increased site risk or degradation of the environment/natural resources. The early and interim action RODs should note that some exposure pathways at the site may not be addressed by the action.

An interim action ROD eventually must be followed by a subsequent ROD for that operable unit based on the complete RI/FS, that includes the baseline risk assessment, in order to document long-term protection of human health and the environment

at that portion of the site. The interim action ROD, however, should demonstrate qualitatively (and quantitatively if possible) that there is a risk or potential for risk and explain how the temporary measures selected will address a portion of this risk.

DOCUMENTATION OF BASELINE RISK ASSESSMENT RESULTS IN THE ROD

The Summary of Site Risks section of the ROD should include a discussion of the risks associated with current and future land use and a table presenting these risk levels for each exposure medium (e.g., direct contact with soil by potential future residents exposed via incidental soil ingestion and dermal contact). In some situations, risks from exposure via more than one medium (e.g., soil and drinking water) will affect the same potentially exposed individual at the same time. It is appropriate in these situations to combine the risks from the different media to give an indication of total risk that an individual may be exposed to from a site.

In addition to summarizing the baseline risk assessment information, the ROD (except no-action RODs) should include how remedial alternatives will reduce risks by achieving cleanup levels through treatment or by eliminating exposures through engineering controls for each contaminant of concern in each appropriate medium.

The Comparative Analysis should include a discussion of each of the nine criteria; consideration of risk is part of the discussion of several of the criteria. The discussion of overall protection of human health and the environment should include a discussion of how the remedy will eliminate, reduce, or control risks identified in the baseline risk assessment posed through each pathway and whether exposure levels will be reduced to acceptable levels. For example, if direct human contact with contaminated soil is identified as a significant risk at a site, the ROD (except no-action RODs) should indicate how the selected remedy will eliminate or control exposures to ensure protection of human health. The discussion of long-term effectiveness and permanence should include, where appropriate, an assessment of the residual risk from untreated residual waste remaining at the site. The short-term effectiveness discussion should address risks during remedial action to those on-site and nearby.

Finally, that part of the Decision Summary in the ROD that focuses on the selected remedy should show:

- the chemical-specific remediation level and corresponding chemical-specific risk level(s) to be attained at the conclusion of the response action and the points (or area) of compliance for the media being addressed; and

- The lead agency's basis for the remediation levels (e.g., risk calculation, ARARs).

The attached table, "Remediation Levels and Corresponding Risks," provides a direct means of displaying this information for health risks and, where appropriate, environmental protection (Table 1). The table should be completed for all media for which the ROD selects final cleanup levels. The table should serve as a summary of text in the selected remedy section of the ROD Decision Summary. For interim action RODs, only qualitative statements may be possible.

Additional guidance on the baseline risk assessment and its role in remedy selection is available from several sources. For guidance on the baseline risk assessment contact:

David Bennett, Chief
Toxics Integration Branch (OS-230)
Hazardous Site Evaluation Division
Office of Emergency and Remedial Response
phone: (FTS) or (202) 475-9486.

For additional guidance on the interaction of the baseline risk assessment and Superfund remedy selection, contact:

David Cooper
Remedial Operations and Guidance Branch (OS-220W)
Hazardous Site Control Division
Office of Emergency and Remedial Response
phone: (FTS) 398-8361
(commercial phone: (703) 308-8361)

For guidance on enforcement-lead sites contact:

Stephen Ells
Guidance and Evaluation Branch (OS-510)
CERCLA Enforcement Division
Office of Waste Programs Enforcement
phone: (FTS) or (202) 475-9803.

NOTICE: The policies set out in this memorandum are intended solely as guidance. They are not intended, nor can they be relied upon, to create any rights enforceable by any party in litigation with the United States. EPA officials may decide to follow the guidance provided in this memorandum, or to act at variance with the guidance, based on an analysis of specific site circumstances. Remedy selection decisions are made and justified on a case-specific basis. The Agency also reserves the right to change this guidance at any time without public notice.

TABLE 1
Remediation Goals and Corresponding Risks [a]

Final Remediation Levels [b]					Corresponding Risk Levels [c]	
					Chemical-Specific RME Risk [d]	
Medium	Chemical	Remediation Level [e]	Point of Compliance [f]	Basis of Goal	Cancer	Non-Cancer
SOIL	A	2.0 ppm	All facility grounds	HI	N/A	0.5
	B	17.0 ppm		Risk	1.0×10^{-5}	N/A
	C	5.0 ppm		GW Risk	N/A	N/A
GROUND WATER	B	0.1 ppm	Waste Management Unit Boundary	Risk	1.0×10^{-5}	N/A
	C	4.0 ppm		MCL	1.0×10^{-5}	N/A
	F	7.0 ppm		MCLG	N/A	0.2
	G	15.0 ppm		MCL	6.0×10^{-6}	0.09
SEDIMENT	Q	100.0 ppm	Downstream from point A	Ecological Effects	N/A	N/A

a. Prepare summary sheets for selected remedy.

b. Final Remediation Levels are based on preliminary remediation goals developed in the Feasibility Study (FS) (RI/FS Guidance 4.2.1) as modified through the nine criteria evaluation and engineering design. In the process of achieving remediation levels for each chemical, some chemicals will be reduced to concentrations below their remediation levels.

c. Chemical specific risks correspond to associated remediation levels. Risks do not consider effects of exposures to other chemicals or media. If appropriate, risks may be summed to calculate media specific risks. Short-term effectiveness is not considered.

d. Cancer risks are measured as individual incremental lifetime; non-cancer, as Hazard Quotients.

e. Bases for values should be explained in the earlier Record Of Decision (ROD) table.

f. Bases for location and method for determining attainment (e.g., maximum value detected over area XYZ) should be explained in the description of the selected remedy.

N/A Not applicable

Interim RCRA/CERCLA Guidance on Non-Contiguous Sites and On-Site Management of Waste and Treatment Residue

14

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

MAR 27 1986

OFFICE OF
SOLID WASTE AND EMERGENCY RESPONSE

9347.0-1

MEMORANDUM

SUBJECT: Interim RCRA/CERCLA Guidance on Non-Contiguous Sites and On-Site Management of Waste and Treatment Residue

FROM: J. Winston Porter
Assistant Administrator

TO: Regional Administrators
Regions I - X

Region VI has recently raised several RCRA/CERCLA interface issues that have broad implications for remedial actions at many other Superfund sites. The purpose of this memorandum is to lay out EPA policy on several of these issues, including:

1. Combined treatment of CERCLA waste from non-contiguous locations;

2. On-site disposal of treatment residue;

3. Limitations on the construction of hazardous waste incinerators for on-site CERCLA use; and

4. Off-site treatment of waste and redisposal on-site.

This memorandum and attachment represent interim guidance which should be used now, but will be refined following regional review. Please submit your comments on this interim guidance to Betsy Shaw (FTS 382-3304) of the Hazardous Site Control Division, Office of Emergency and Remedial Response by April 28, 1986. We are particularly interested in comments which address the implications of this guidance for Superfund removal actions at both NPL and non-NPL sites.

Select RCRA/CERCLA Issues:

1. Combined treatment and/or disposal of CERCLA waste from non-contiguous NPL sites

NPL sites may be combined for remedial action if the following statutory criteria are met: the sites must be geographically close or pose similar threats to public health and the environment (CERCLA §104 (d)(4)). If combined remedial actions will involve the transport of waste from one site to another site, the wastes must be compatible for the selected treatment or disposal method and managed in a manner that is part of the highly reliable long-term remedy selected for that site or group of sites. Combined remedies must be cost-effective and should not result in any significant additional short-term impacts on public health and the environment at the receiving site. As in every case, CERCLA waste which is transported must be manifested. The Record of Decision (ROD) for a remedial action that involves more than one site should state that several sites are being treated as one and that their combined treatment constitutes on-site action. (See attachment.)

2. On-site management of waste and treatment residue

EPA interprets CERCLA to require that off-site treatment, storage and disposal of hazardous wastes comply with all RCRA requirements, including permitting. With respect to on-site disposal, the National Contingency Plan (50 FR 47912, November 20, 1985) requires that CERCLA activities meet the technical requirements of RCRA (and other Federal environmental requirements) that are applicable or relevant and appropriate[1] while the procedural requirements, such as permitting, need not be met.

Waste and treatment residues may be managed on-site in several ways. The approach selected will depend on the cost-effectiveness analysis at each site. One approach is to remove the waste (and treat if desired) and dispose of the waste and/or treatment residue in a new on-site land disposal unit. This unit would meet the technical RCRA Subtitle C land disposal requirements of 40 CFR Part 264 (e.g. §264.301 design and operating requirements; and land disposal closure and post closure care requirements in §264.310).

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[1] "Applicable requirements" are those Federal requirements that would be legally applicable if the response actions were not undertaken pursuant to CERCLA §104 and §106. "Relevant and appropriate requirements" are those Federal requirements that, while not applicable, are designed to apply to problems sufficiently similar to those encountered at CERCLA sites that their application is appropriate.

The second approach allows waste to be removed, treated and the residuals to be replaced in the area from which they originated. The area would then be capped and monitored consistent with the technical requirements of land disposal closure (§264.310). Under this approach, a double liner/ leachate collection system would not be required if the wastes are removed during closure for the purpose of treating them to enhance the effectiveness of the closure.

A third approach requires no further management of waste or treatment residue if the waste can be evaluated, determined to be non-hazardous and delisted. This would normally entail preparing a delisting analysis using the Vertical and Horizontal Spread (VHS) model (50 FR 48886, November 27, 1985) or other similar generic models that do not consider site specific factors. A delisting petition is not required for on-site CERCLA actions.

Finally, the National Contingency Plan (40 FR 47947 - 47948) provides for selection of a remedy that does not attain applicable or relevant and appropriate requirements if: 1) the alternative is only an interim remedy; 2) the need to use the Fund at other sites outweighs the need to implement a remedy that fully attains all requirements; 3) it is technically impractical to implement a remedy that meets all applicable or relevant and appropriate requirements; 4) meeting all such requirements will result in an unacceptable environmental impact; or 5) there is an overriding public interest related to enforcement.

The determination that RCRA requirements for treatment, storage and disposal will be met should be made during the Remedial Investigation and Feasibility Study (RI/FS). In the case of incinerator residue, a waste analysis should be conducted during the RI to provide the necessary data. Subsequent analyses, including a test burn, may be conducted during Remedial Design (RD) as appropriate on a case by case basis. Assurance of the consistency of the remedy with RCRA and other applicable or relevant and appropriate Federal requirements should be presented in the ROD, and, if appropriate, reviewed again during RD.

3. <u>Limitations on the construction of hazardous waste incinerators for on-site CERCLA use</u>

If an incinerator is to be constructed for on-site remedial action, there should be a clear intent to dismantle or remove the unit after the CERCLA action is completed. Dismantling or removal should be a part of the remedy presented in the ROD and funds should be included in the financial or contractual documents. Should there be plans to accept commercial waste at the facility after the CERCLA wastes have been treated or destroyed, it is EPA policy that a RCRA permit be obtained before the unit is constructed. (See attachment.)

4. Off-site treatment of waste and redisposal on-site

On-site disposal may involve transport of waste off-site for treatment or storage if the CERCLA waste or treatment residue is ultimately disposed of at the site of waste origin. For this activity, the CERCLA waste is manifested to and from the site and maintained separately throughout all off-site activities.

If you have any questions regarding this memorandum or attachment, please call Betsy Shaw or Bill Hanson (FTS 382-2345).

Attachment

Attachment: Interim RCRA/CERCLA Guidance on Non-Contiguous Sites and On-Site Management of Waste and Treatment Residue

Combining Hazardous Waste Sites for Remedial Action

Background:

Several situations have arisen where it may be advantageous to combine several NPL sites together for the purpose of conducting a more effective remedial action. Subject to the requirements in CERCLA §104 (d)(4), sites in proximity to one another, sites with similar wastes, and sites with the same PRPs may be good candidates for combined remedial actions. A treatment system or incinerator, for example, may be more efficient treating wastes from several sites. Expected economies of scale would lower the unit costs and favor more reliable technologies. Overall, protection of public health and the environment may increase if the waste of several smaller sites are combined at a central treatment or disposal location.

Legislative Authority: Section 104(d)(4) of CERCLA states that non-contiguous sites may be treated as one site when the separate sites are reasonably related on the basis of:

1) Geography; or
2) Threat or potential threat to public health and the environment.

Cost-Effective Reasons for Combining NPL Sites for Remedial Action

Several different circumstances may occur that favor combining site remedial actions.

Example 1: Incineration is effective for destroying wastes at several closely arrayed sites. One alternative is to use a mobile incinerator at each site. Another alternative that may be cost effective is to incinerate the wastes of several sites at one location. The residue could be disposed at the original site but, again, it would probably be more cost-effective to dispose of all ash at the same location.

Example 2: Construction of a new on-site land disposal facility has been found to be cost effective at site A. Wastes at nearby site B are similar in character and a small quantity needs to be managed.

Site B wastes could be managed on-site but it could be less expensive and more effective to dispose of the waste at Site A.

Example 3: Site A and Site B have similar wastes and are close to one another. RCRA closure with a cap has been found to be cost effective at both sites. It may be cost effective to design and remediate both sites at the same time. Therefore, the State or Region would like to contract with one design firm and one construction company to undertake both remedies.

Regions should identify opportunities to combine RI/FSs for several NPL sites in the Site Management Plan or other pre-remedial activities. Combining RI/FSs may improve the timing and effectiveness of remedial actions and should be shown in the Superfund Comprehensive Accomplishments Plan (SCAP).

Criteria for Treating Non-Contiguous Sites as One

The September 21, 1984 NPL listing (40 FR 37076) provides the flexibility to respond to several sites listed separately on the NPL with a single response if the statutory factors are met and it appears cost-effective to do so.

The following criteria would be used to treat non-contiguous sites as one when transportation of the waste is involved:

1. Sites are reasonably close to one another;

2. Wastes must be compatible for the selected treatment or disposal approach;

3. Wastes that are transported to another site need to be managed in a manner that is part of a highly reliable, long-term remedy;[1] and

4. Incremental short-term impacts (e.g. sudden releases, fugitive dust and fumes) to public health and the environment at the receiving site will be minimal. (This factor is important when the receiving site is located near a residential community.)

Of course, the remedy must also be cost-effective by either costing less or by providing increased or more reliable protection of public health and environment than two separate remedies.

When short-term impacts are found to be significant, combining sites may be determined to be inappropriate and the remedy may be reconfigured. Options include but are not limited to:

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[1] This type of remedy generally is defined as:
a. Requiring little or no long-term active O/M;
b. Relatively low probability of release to the environment;
c. If a release did occur, it would not endanger public health or the environment.

1. Use another hazardous waste site where there would be fewer impacts;

2. Pretreat wastes at the original site locations (e.g., metal extraction) or improve materials handling procedures;

3. Dispose of treated residuals (e.g., incineration ash) at originating sites.

If incremental short-term impacts are significant and cannot be mitigated, then non-contiguous sites should not be treated as one for the purpose of combined treatment or disposal regardless of cost-effectiveness.

CERCLA Compliance with Other Environmental Laws

Under response actions occuring at non-contiguous sites which are treated as on-site actions, Superfund or PRPs under an EPA approved enforcement action would:

1. Manifest hazardous wastes transported to another site;

2. Meet the applicable or relevant and appropriate technical requirements of RCRA TSD facilities but would not be required to obtain RCRA permits.

Limitation: The cost of dismantling or removing a treatment or storage unit constructed as part of an on-site remedy should be factored into the determination of the cost-effectiveness of that remedy. If that alternative is selected, funds for the dismantling of the unit should be included in the remedy obligation. Should there be plans for a treatment or storage unit constructed as part of an on-site remedy to accept commercial wastes after the CERCLA waste has been processed, it is EPA policy that a RCRA permit be obtained before the unit is constructed. The cost and scheduling implications of obtaining a permit should also be factored into the analysis of cost-effectiveness.

Proposed Implementation Process:

1. Initial evaluation of NPL sites to determine if the RI/FSs of several sites should be combined. Show combined RI/FSs on SCAP.

2. Feasibility Study recommends that a combined site action would be cost-effective. Further, the Feasibility Study shows that the selected remedy meets the necessary criteria of this policy. (The NPL need not be amended.)

3. A joint public comment period is held to seek comment from all interested parties on the proposed consolidation of sites and a responsiveness summary is written.

4. Regional Administrator or Assistant Administrator signs Record of Decision for non-contiguous site action.

5. A new Record of Decision, public comment period and responsiveness summary would be required if additional sites are added to the response plan after the first Record of Decision.

NATIONAL PRIORITIES LIST
CHECKLIST OF DATA REQUIREMENTS

Site Name: _____

Notes: _____
_____
_____
_____
_____
_____

DATA ELEMENT/PATHWAY	Available	Not Appropriate
Ground and Surface Water and Air		
1. Waste physical state	_____	
2. Persistence	_____	
3. Toxicity	_____	
4. Quantity	_____	
Ground Water		_____
1. Monitoring data OR	_____	
1a. Depth of aquifer	_____	
1b. Net precipitation	_____	
1c. Permeability	_____	
2. Ground water use	_____	
3. Distance to nearest down-gradient well	_____	
4. Population served by wells within 3 miles	_____	
Surface Water		_____
1. Monitoring data OR	_____	
1a. Slope and terrain	_____	
1b. Rainfall intensity	_____	
1c. Distance to surface water	_____	
1d. Flood potential	_____	
2. Surface water use	_____	
3. Critical habitats	_____	
4. Population served	_____	
Air		_____
1. Monitoring data	_____	
2. Waste reactivity	_____	
3. Incompatibility	_____	
4. Toxicity	_____	
5. Distance to nearest population	_____	
6. Population within 1 mile	_____	
7. Critical environments	_____	
8. Land use	_____	

A Guide to Delisting of RCRA Wastes for Superfund Remedial Responses

15

United States Environmental Protection Agency

Office of Solid Waste and Emergency Response

Superfund Publication: 9347.3-09FS September 1990

EPA

A Guide to Delisting of RCRA Wastes for Superfund Remedial Responses

Office of Emergency and Remedial Response
Hazardous Site Control Division 0S-220

Quick Reference Fact Sheet

On-site CERCLA remedial response actions must comply with the substantive requirements of the Resource Conservation and Recovery Act (RCRA) when they are determined to be applicable or relevant and appropriate requirements (ARARs). RCRA requirements are applicable for CERCLA responses involving the treatment, storage, or disposal of RCRA wastes (or when disposal of the waste being addressed under CERCLA occurred after November 19, 1980). Delisting a RCRA waste (and thus removing it from regulation under RCRA Subtitle C) is one option available to site managers for addressing wastes or treatment residuals containing hazardous constituents in low concentrations (i.e., at or near health-based levels). **This guide discusses the circumstances under which delisting wastes may be appropriate and the procedures for delisting a RCRA hazardous waste as part of a Superfund remedial response.** (For additional information, please see Petitions to Delist Hazardous Wastes: A Guidance Manual (Office of Solid Waste and Emergency Response, April 1985 EPA/530-SW-85-003).)

BACKGROUND

There are two types of RCRA waste that are subject to RCRA Subtitle C hazardous waste requirements: listed and characteristic. Listed wastes are regulated under Subtitle C until they have been delisted, at which time they may be disposed of in a Subtitle D facility. Delisting requires a demonstration that a listed RCRA hazardous waste, or a mixture containing listed hazardous wastes, no longer meets any of the criteria under which the waste was listed and no other factors are known that would make the waste hazardous. Delisting applies only to listed wastes, mixtures containing listed wastes, or residuals derived from treatment of a listed waste. Characteristic hazardous wastes do not have to be delisted in order to be eligible for management in a Subtitle D facility, but may simply be rendered "non-characteristic" (i.e., treated to no longer exhibit any of the characteristics outlined in 40 CFR Part 261, Subpart C), or meet the Land Disposal Restriction (LDR) treatment standards.

For on-site CERCLA remedial response actions, delisting of RCRA wastes is accomplished by incorporating the substantive requirements of 40 CFR 260.20 and .22 into the remedial process. For off-site CERCLA response actions, the administrative requirements of 40 CFR 260.20 and .22 must also be met.

WHEN TO CONSIDER DELISTING

Site managers may want to consider delisting when planning CERCLA response actions that will address materials contaminated with RCRA listed waste in low concentrations (including treatment residuals that, despite treatment, remain listed wastes under the derived-from rule [40 CFR 261.3(c)(2)]). If site managers believe that these materials pose no significant threat to ground water and that management in a Subtitle D solid waste disposal facility (to prevent direct contact) would be fully protective of human health and the environment, delisting as a potential option should be evaluated. Unless listed wastes can be delisted, management of these materials must be in accordance with Subtitle C (i.e., clean closure or landfill closure with an impermeable cap, or a hybrid closure where RCRA closure requirements are relevant and appropriate).

BASIS FOR DELISTING

Under RCRA, once sufficient data are collected on the waste, and its potential fate and transport, models (see **Highlight 1**) are run to evaluate the dilution and attenuation of constituents at a hypothetical receptor well. The calculated concentrations of constituents at the hypothetical receptor well must at least meet the health-based levels used for delisting decisions for the waste to be successfully delisted. (**Table 1**, inserted in this fact sheet, contains the maximum allowed concentrations (MACs) for specific constituents based on the current health-based levels (10^{-6} risk) developed by the Office of Solid Waste for delisting decisions.)

During site characterization and the development of the baseline risk assessment, if analyses indicate that minimal risks are posed by identified RCRA listed wastes, (i.e., they are already at or near delisting levels) site managers should consider management options involving the delisting of wastes. Delisting evaluations should be made early in the RI/FS process, thus allowing the requirements and disposal options associated with delisting to be factored into the detailed analysis of remedial alternatives. For delistings at CERCLA sites, OERR recommends that site managers use the same

Highlight 1 - MODELS USED BY THE OFFICE OF SOLID WASTE TO JUSTIFY DELISTING PETITIONS

The recently promulgated toxicity characteristic leaching procedure (TCLP) is used to measure the leaching potential of selected inorganic and organic constituents (55 FR 11798, March 29, 1990). For some organics, the **Organic Leachate Model (OLM)** (see 51 FR 41084-100, November 13, 1986) may be used to estimate the leaching potential of these constituents. The OLM is based on data from leaching tests performed on wastes with organics. Data generated from the TCLP (and possibly the OLM) are used in the appropriate models to determine whether the waste will pose a threat to human health and the environment.

EPA uses an appropriate model, such as the VHS model, to estimate the ability of an aquifer to dilute the leachate toxicants and predict toxicant levels at a receptor well. (See 50 FR 48846, November 27, 1985 for a complete description of the VHS model.) The predicted levels of toxicants from the VHS model are then compared to health-based levels used in delisting decision-making (e.g., MCLs, RfDs) for those compounds, in an effort to evaluate hazard potential.

analytical tests and models as the Office of Solid Waste to analyze and predict the potential fate and transport of waste constituents and to substantiate a delisting request.

In certain cases, pathways other than ground water may present a greater concern, or site conditions are such that use of other or additional models (e.g., air models, 51 FR 41084, November 13, 1986) may be appropriate. Because the delisting determination is waste-specific, site managers should document why a particular model is being used.

If results from treatability studies conducted during an RI/FS indicate that treatment will attain delisting levels, these data may serve as the basis for approving a delisting demonstration. When site-specific treatability study data are not available, data from the application of technologies to similar wastes may be used to assess the likely effectiveness of the treatment processes and to demonstrate that a particular waste would be rendered non-hazardous and justify a delisting. If there are technically sound reasons to believe that delisting levels can be attained, site managers still may seek to delist the wastes, but should specify another option for disposal of the material (i.e., Subtitle C disposal) if delistable levels are not attained.

As outlined in the NCP (55 FR 8756, March 8, 1990), only the substantive requirements of delisting must be met for on-site CERCLA responses. The delisting may be granted when the Regional Administrator signs the ROD. For off-site actions, the Office of Solid Waste and Emergency Response (Contact: Assistance Branch (OS-343) 382-4206) makes delisting decisions. The formal RCRA administrative process for delisting would not apply, however, to non-contiguous CERCLA facilities meeting the criteria to be treated as one site and to which the on-site permit exemption extends (see NCP, 55 FR 8690-1, March 8, 1990).

DEMONSTRATING COMPLIANCE

Verification testing may be required following treatment of the wastes to confirm that delisting levels are attained. Verification testing may require: collection of samples generated from treatment systems; analysis of samples for total and TCLP leachate concentrations of inorganic and organic constituents, and any other RCRA characteristics (as appropriate)[1]; and analysis of any other information relevant to the delisting that may not have been anticipated at the time that the original decision document was signed. The specific demonstrations required may vary based on process- or waste-specific conditions at the site. [NOTE: An appropriate testing frequency of treatment residuals will need to be established during the design phase for a period long enough to represent the variability of the delisted material.] All data from verification testing must be collected using the appropriate QA/QC procedures (such as those contained in the site's Quality Assurance Project Plan (QAPP) prepared during the RI/FS scoping or remedial design process).

Waste to be delisted must be managed as hazardous until it has been analyzed in accordance with the sampling and analysis requirements established at the time of delisting, and it has been determined that delisting levels have been attained. Therefore, temporary storage of waste residuals will be necessary in some cases until sampling results are received. RCRA storage requirements that are ARAR must be met (or a waiver justified) during this period for remedial actions.

DOCUMENTING A WASTE DELISTING

Although compliance with the RCRA administrative delisting requirements are not required as part of an on-site CERCLA remedial response, compliance with the substantive requirements of delisting must be documented in the appropriate CERCLA documents. Since off-site CERCLA responses must comply with both substantive and administrative requirements, site managers must follow the formal delisting petition process (40 CFR 260.20 and .22) when hazardous wastes or waste residuals are to be delisted for management off-site. This includes Office of Solid Waste review, or State review for those States that have adopted the delisting program at least equivalent to the Federal program, publication of a proposed notice in the Federal Register, an opportunity for public comment, and publication of the final rule in the Federal Register. The Office of Solid Waste's goal

[1]Note that for any responses expected to take place prior to the TCLP effective date, the EP Toxicity test may apply.

Table 1: Maximum Allowed Concentrations

Maximum allowed concentrations (MACs) are back-calculated from the VHS model, using a minimum waste volume of 8000 cubic yards. (Lower waste volumes will result in higher MACs. If the waste contains <0.5% solids, then the leaching procedures cannot be performed. In that case, the total constituent concentrations should be compared to the MACs. These MACs represent the maximum concentrations below which a constituent would "pass" the VHS model, and thus, the waste would be considered a candidate for delisting. These MACs are to be used only as guidance for delisting, not for cleanup levels.

The MACs listed here are based on use of the VHS model and the current health-based levels used for delisting decision-making. If a different model is used and/or if a health-based level changes, then the calculated MAC will also change. The MACs listed here for organic constituents are based on OLM leachate values. In the near future, petitioners may be required to measure organic constituent leaching using the TCLP. (Thus, TCLP leachate data will replace OLM calculated data in the VHS model.) Therefore, if the TCLP is used in place of the OLM for organic constituents, then the TCLP leachate value would be compared to the MAC level listed in the table for liquids.

The numbers shown in the table are given in exponential form. The notation XE+YY is equivalent to $X \times 10^{YY}$. For example: 5.170E+02 is equivalent to 5.170×10^{2} or 517.0
3.785E-04 is equivalent to 3.785×10^{-4} or .0003785.

Chemical	MAC for Solids (ppm)	MAC for Liquids (mg/L)	Chemical	MAC for Solids (ppm)	MAC for Liquids (mg/L)	Chemical	MAC for Solids (ppm)	MAC for Liquids (mg/L)
Acetone	5.170E+02	2.524E+01	2-sec-Butyl-4,6-dinitrophenol	1.348E+02	2.524E-01	1,2-Dichlorobenzene	4.999E+03	3.785E+00
Acetonitrile	6.231E+00	1.262E+00	Cadmium	6.309E-02	6.309E-02	1,3-Dichlorobenzene	4.790E+04	1.893E+00
Acetophenone	9.049E+03	2.524E+01	Carbon disulfide	1.277E+04	2.524E+01	1,4-Dichlorobenzene	2.650E+02	4.732E-01
Acrolein	1.181E+00	3.15E+00	Carbon tetrachloride	1.408E+00	3.155E-02	3,3'-Dichlorobenzidine	5.656E-02	5.047E-04
Acrylamide	Treat. Tech	Treat. Tech	Chloral	2.840E+00	4.416E-01	Dichlorodifluoromethane	1.063E+05	4.416E+01
Acrylic Acid	3.382E+02	1.893E+01	Chlordane	1.924E+01	1.262E-02	1,1-Dichloroethane	1.140E-02	2.524E-03
Acrylonitrile	3.785E-04	3.785E-04	p-Chloraniline	4.741E+01	6.309E-01	1,2-Dichloroethane	3.717E-01	3.155E-02
Aldicarb	1.253E+00	6.309E-02	Chlorobenzene	1.526E+02	6.309E-01	1,1-Dichloroethylene	1.270E+00	4.416E-02
Aldrin	1.351E-03	1.262E-05	Chlorobenzilate	4.312E+02	4.416E+00	cis-1,2-Dichloroethylene	2.973E+01	4.416E-01
Allyl Alcohol	9.025E+00	1.262E+00	p-Chloro-m-cresol	1.327E+02	1.262E+00	trans-1,2-Dichloroethylene	3.641E+01	6.309E-01
Aluminum Phosphide	6.309E-02	6.309E-02	Chlorodibromomethane	7.825E+02	4.416E+00	Dichloromethane	2.324E-01	3.155E-02
Aniline	2.236E-01	3.785E-02	Chloroform	4.968E-01	3.785E-02	2,4-Dichlorophenol	4.329E+01	6.309E-01
Anthracene	7.701E+01	1.262E-02	Chloromethyl methyl ether	Decomposes	2.524E-05	1,2-Dichloropropane	6.995E-01	3.155E-02
Antimony	6.309E-02	6.309E-02	2-Chlorophenol	4.412E+01	1.262E+00	1,3-Dichloropropene	5.946E-03	1.262E-03
Arsenic	3.155E-01	3.155E-01	Chromium	3.155E-01	3.155E-01	Dieldrin	1.292E-03	1.262E-05
Barium	6.309E+00	6.309E+00	Chrysene	1.516E+01	1.262E-03	Diethyl phthalate	4.795E+05	1.893E+02
Benzene	8.879E-01	3.155E-02	Cresols	1.257E+03	1.262E+01	Dimethoate	3.377E-01	4.416E-02
Benzidine	1.262E-06	1.262E-06	Cyanide	4.416E+00	4.416E+00	7,12-Dimethylbenz(a)anthracene	3.743E-03	6.309E-06
Benz(a)anthracene	9.690E-02	6.309E-05	Cyanogen	1.435E+02	6.309E+00	2,4-Dimethylphenol	1.248E+01	1.262E-01
Benzo(a)pyrene	3.867E-02	1.893E-05	Cyanogen bromide	1.893E+01	1.893E+01	2,6-Dimethylphenol	2.829E-01	1.262E-02
Benzo(b)fluoranthene	1.643E-01	1.262E-04	2,4-Dichlorophenoxyacetic			3,4-Dimethylphenol	1.224E+01	2.524E-02
Benzo(k)fluoranthene	7.790E+02	2.524E-02	acid (2,4-D)	1.069E+02	6.309E-01	Dimethyl phthalate	9.232E+06	2.524E+03
Benzyl chloride	5.432E-03	1.262E-03	DDD	5.982E-01	6.309E-04	Dinitrobenzene (meta)	1.317E+00	2.524E-02
Bis(2-chloroethyl)ether	1.893E-04	1.893E-04	DDE	9.902E-01	6.309E-04	4,6-Dinitro-o-cresol	5.127E+01	2.524E-01
Bis(2-chloroisopropyl ether)	2.234E+03	6.309E+00	DDT	3.109E+00	6.309E-04	2,4-Dinitrophenol	2.296E+01	4.416E-01
Bis(2-ethylhexyl)phthalate	4.210E+01	1.893E-02	Dibenz(a,h)acridine	6.554E-02	1.893E-05	Dinitrotoluene	1.164E-03	3.155E-04
Bromodichloromethane	7.546E+02	4.416E+00	Dibenz(a,h)anthracene	7.318E-03	4.416E-06	Di-n-octyl phthalate	3.441E+04	3.785E+00
Bromomethane	3.606E+01	3.155E-01	1,2-Dibromo-3-chloropropan	1.048E-02	1.262E-03	1,4-Dioxane	2.021E-02	1.893E-02
Butyl benzyl phthalate	6.375E+04	5.678E+00	Di-n-butyl phthalate	2.521E+05	2.524E+01	Diphenylamine	1.232E+04	5.678E+00

Table 1: Maximum Allowed Concentrations (cont.)

Chemical	MAC for Solids (ppm)	MAC for Liquids (mg/L)
1,2-Diphenylhydrazine	6.976E-04	2.524E-04
Disulfoton	8.561E-01	6.309E-03
Endosulfan	1.983E+01	1.262E-02
Endrin	1.004E+00	1.262E-03
Epichlorohydrin (1-Chloro-2,3-epoxypropane)	Treat. Tech	Treat. Tech
Ethyl benzene	4.964E+03	4.416E+00
Ethyl ether	2.598E+04	1.262E+02
Ethylene dibromide	6.078E-04	3.155E-04
Ethylene oxide	6.309E-04	6.309E-04
Fluoranthene	2.971E+04	1.262E+00
Fluorene	1.048E+01	1.262E-02
Formic Acid	3.523E+04	4.416E+02
Glycidylaldehyde	7.510E-02	6.309E-02
Heptachlor	3.345E+00	2.524E-03
Heptachlor epoxide (alpha, beta, gamma isomers)	8.346E-01	1.262E-03
Hexachlorobenzene	2.619E-01	1.262E-04
Hexachlorobutadiene	5.139E+00	3.155E-03
Hexachlorocyclopentadiene	8.283E+03	1.262E+00
Hexachloroethane	2.956E+00	1.893E-02
Hexachlorophene	3.131E+03	6.309E-02
Hydrazine	6.309E-05	6.309E-05
Hydrocyanic acid (Hydrogen cyanide)	4.416E+00	4.416E+00
Hydrogen sulfide	6.309E-01	6.309E-01
Indeno(1,2,3,cd)pyrene	2.970E+01	1.262E-03
Isobutanol	8.244E+03	6.309E+01
Isophorone	1.345E+04	4.416E+01
Lead	Under consideration by EPA	
Lindane	1.513E-01	1.262E-03
Maleic anhydride	Soluble	2.524E+01
Maleic hydrazide	9.263E+04	1.262E+02
Mercury	1.262E-02	1.262E-02
Methacrylonitrile	1.479E-01	2.524E-02
Methanol	5.552E+03	1.262E+02

Chemical	MAC for Solids (ppm)	MAC for Liquids (mg/L)
Methomyl	2.743E+02	5.678E+00
Methoxychlor	2.633E+04	6.309E-01
Methyl chloride	8.255E+03	2.524E+01
Methyl chlorocarbonate	1.543E+04	2.524E+02
Methyl ethyl ketone	3.838E+02	1.262E+01
Methyl isobutyl ketone	1.641E+03	1.262E+01
Methyl methacrylate	1.301E+05	1.893E+01
Methyl parathion	1.351E+01	5.678E-02
Naphthalene	5.738E+05	6.309E+01
Nickel	Under consideration by EPA	
Nitric oxide	2.524E+01	2.524E+01
Nitrobenzene	6.557E+00	1.262E-01
Nitrogen dioxide	2.524E+02	2.524E+02
N-Nitroso-di-n-butylamine	2.088E-05	3.785E-05
N-Nitrosodiethanolamine	6.309E-05	6.309E-05
N-Nitrosodiethylamine	1.262E-06	1.262E-06
N-Nitrosodimethylamine	5.611E-06	4.416E-06
N-Nitrosodiphenylamine	1.166E+01	4.416E-02
N-Nitroso-n-propylamine	3.155E-05	3.155E-05
Nitrosopyrrolidine	1.262E-04	1.262E-04
Pentachlorobenzene	2.284E+03	1.893E-01
Pentachloronitrobenzene	7.216E-01	6.309E-04
Pentachlorophenol	2.917E+03	1.262E+00
Phenanthrene	1.398E+01	1.262E-02
Phenol	2.051E+04	1.262E+02
m-Phenylenediamine	1.108E+01	1.262E+00
Phenyl mercury acetate	4.289E-01	1.893E-02
Phosphine	5.803E+00	6.309E-02
Phthalic anhydride	5.788E+05	4.416E+02
Polychlorinated biphenyls	1.223E+01	3.155E-03
Pronamide	5.459E+04	1.893E+01
Pyrene	4.076E+05	6.309E+00
Pyridine	3.364E+00	2.524E-01
Selenious acid	6.309E-01	6.309E-01
Selenium	6.309E-02	6.309E-02

Chemical	MAC for Solids (ppm)	MAC for Liquids (mg/L)
Selenourea	No Solubility	1.262E+00
Silver	3.155E-01	3.155E-01
Strychnine and salts	9.332E+00	6.309E-02
Styrene	2.343E+00	3.155E-02
1,2,4,5-Tetrachlorobenzene	5.603E+01	6.309E-02
1,1,2,2-Tetrachloroethane	5.832E-03	1.262E-03
Tetrachloroethylene	3.430E+00	3.155E-02
2,3,4,6-Tetrachlorophenol	2.992E+03	6.309E+00
Tetraethyl dithiopyrophosphat	6.425E+01	1.262E-01
Tetraethyl lead	1.652E-03	2.524E-05
Thallium	1.893E-02	1.893E-02
Thiourea	1.262E-04	1.262E-04
Thiram	1.918E+03	1.262E+00
Toluene	1.173E+04	1.262E+01
Toluene-2-6-diamine	2.888E+03	3.785E+01
Toxaphene	7.909E+01	3.155E-02
2,4,5-TP (Silvex)	9.905E+00	6.309E-02
Tribromomethane (Bromoform)	9.642E+02	4.416E+00
1,2,4-Trichlorobenzene	1.217E+04	4.416E+00
1,1,1-Trichloroethane	2.229E+02	1.262E+00
1,1,2-Trichloroethane	2.315E-02	3.785E-03
Trichloroethylene	1.146E+00	3.155E-02
Trichlorofluoromethane	8.474E+04	6.309E+01
2,4,5-Trichlorophenol	2.101E+04	2.524E+01
2,4,6-Trichlorophenol	3.536E-01	1.262E-02
2,4,5-Trichlorophenoxyacetic	1.698E+03	2.524E+00
1,2,3-Trichloropropane	1.399E+02	1.262E+00
1,1,2-Trichloro-1,2,2-tri-fluoroethane	1.002E+09	6.309E+03
sym-Trinitrobenzene	5.572E-01	1.262E-02
2,4,6-Trinitrotoluene	3.993E-01	6.309E-03
Vanadium pentoxide	4.416E+00	4.416E+00
Vinyl chloride	1.822E-01	1.262E-02
Warfarin	3.159E+01	6.309E-02
Xylene (mixed)	2.177E+05	6.309E+01

is to propose and finalize delistings within 24 months from the time a complete petition is received.

RI/FS Report

The substantive requirements for delisting a RCRA hazardous waste should be documented in the RI/FS Report. In the Detailed Analysis of Alternatives chapter of the FS Report, a general discussion of why delisting is warranted should be included in the description of each alternative for which a delisting is contemplated. Where the remedial alternatives involving treatment are expected to result in a residual that may be delisted, this discussion should also specify the concentrations of each waste constituent expected to remain after treatment. The specific information that should be included in an RI/FS report for on-site and off-site CERCLA remedial actions is presented in **Highlight 2.** (The more specific and detailed information, such as relevant waste analysis data from sampling, should be placed in an appendix to the report.) Under the "Compliance with ARARs" Criterion, as part of the Description of Alternatives section, site managers should identify those wastes or waste residuals to be delisted, and managed under Subtitle D instead of Subtitle C.

Proposed Plan

The intent to delist wastes should be stated in the Description of Alternatives section of the Proposed Plan. Because the Proposed Plan solicits public comment on all of the remedial alternatives, and not just the preferred option, the intent to delist wastes on-site or to obtain a delisting petition for off-site wastes should be identified for all alternatives for which such an approach is planned. This opportunity for public comment on the Proposed Plan fulfills the requirements for public notice and comment on delisting petitions required under 40 CFR 260.20(d). **Highlight 3** provides sample language for the Proposed Plan.

Record of Decision

Sample language for the Description of Alternatives section of the ROD is shown in **Highlight 4.** The documentation provided in the ROD should be a brief synopsis of the information in the FS report. In the Description of Alternatives section, as part of the discussion of major ARARs for each remedial alternative, site managers should include a statement (as was done in the FS report) that explains why delisting is justified. A statement should

Highlight 2 - DOCUMENTATION FOR RI/FS REPORT FOR DELISTING
(Detailed Analysis of Alternatives Chapter)

ON-SITE:

- Description of Remedial Alternatives
- Detailed Description of the Treatment Process being used to render the waste non-hazardous (e.g., operating parameters)
- Waste and Treatment Residual Characterization
  - EPA Hazardous Waste Number(s)
  - Complete Description of the Waste (e.g., matrix, percent solids, pH)
  - Waste Management Information (e.g., current and proposed management, techniques, flow diagrams)
  - Description of Constituents present (identification, concentrations)
- Relevant Sampling and Testing Information[1] (e.g., TCLP test results)
- Data on Representative Samples for the Listed Constituents and a Discussion of Why the Waste is Non-Hazardous. Include a statement that the samples are representative of constituent concentrations in the waste, and discuss modelling results.
- CERCLA on-site response actions need not meet administrative procedures of other environmental statutes. The RI/FS and ROD process are substitutes for the administrative procedures in the delisting process. The substantive requirements remain the same (55 FR 8756 -57, March 8, 1990).

OFF-SITE (in addition to elements required for off-site petition):

For off-site delisting petitions, the documentation requirements listed for on-site actions should be extracted from the RI/FS report and combined with the following information found below. The information should be incorporated with the on-site information into a 40 CFR 260.20 petition and a copy of the petition should be referenced and attached to the RI/FS report.

- Petitioner's name and address
- Identification of on-site contact person, if different from above
- Description and location of site
- Statement of the petitioner's interest in the proposed action

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[1] Appropriate sampling information may be contained in the Superfund Quality Assurance Project Plan (QAPP) and, therefore, not specifically repeated in the RI/FS Report. Where appropriate, however, information on relevant sampling procedures should be referenced in this section when discussing the basis for delisting.

Highlight 3: SAMPLE LANGUAGE FOR THE PROPOSED PLAN

Description of Alternatives section:

Under this alternative, the [waste/treatment residuals] will be delisted (i.e., shown to be non-hazardous wastes) and thus will no longer be subject to RCRA Subtitle C hazardous waste regulations. The [wastes/treatment residuals] will be managed in accordance with the RCRA Subtitle D (solid waste) requirements (and/or state solid waste disposal requirements).

Evaluation of Alternatives section, under "Compliance With ARARs":

The [wastes/treatment residuals] will be delisted in [Enter number] of [Enter total number of alternatives]. The RCRA Subtitle D (solid waste) closure requirements, rather than Subtitle C requirements, will be ARARs for these [wastes/treatment residuals].

Community's Role in Selection Process:

The Proposed Plan seeks comment on the delisting of the [waste/treatment residuals and models] for each alternative for which delisting is proposed.

Highlight 4: SAMPLE LANGUAGE FOR THE RECORD OF DECISION

Description of Alternatives section:

Because existing and available data and the results of modeling demonstrate that the [waste/treatment residuals] will not be hazardous (i.e., do not contain hazardous constituents in levels that are hazardous and do not exhibit a hazardous characteristic), they will be delisted. Therefore, the RCRA Subtitle C requirements are not ARARs. These [wastes/treatment residuals], however, will be managed as solid wastes under RCRA Subtitle D [and State of {name} solid waste disposal requirements under {citation}]. This delisting is justified on the basis of [results from treatability testing/other basis]. This delisting satisfies the substantive requirements of 40 CFR 260.20 and .22.

If testing of the waste during the remedial action shows that the necessary levels are not being attained for delisting these wastes, they will be managed as Subtitle C hazardous wastes and the applicable or relevant and appropriate requirements under Subtitle C will be met.

also be included explaining that the waste was delisted under CERCLA, therefore RCRA's substantive requirements have been met.

In the Statutory Determinations section, under the "Compliance with ARARs" finding, site managers should indicate that the wastes will be delisted.

Unless treatability studies conducted in the RI/FS indicate that a technology's performance is reasonably certain, the ROD should address how to handle wastes that do not achieve delistable levels. If waste residuals cannot be delisted, a contingency plan will be implemented. Where the contingency implemented differs significantly from that discussed in the ROD, the ROD must be amended or an Explanation of Significant Differences (ESD) issued (NCP §300.435(c)(2)). Where the contingency implemented does not significantly differ from that discussed in the ROD, it may be advisable to issue an ESD or fact sheet to inform the public of these actions.

The Comparative Analysis section of the ROD should discuss contingent remedies in a level of detail that is adequate to explain the contingency (so that the public has an ample opportunity to review the contingency). The Selected Remedy section should establish the parameters of both the selected and contingent remedies and provide the criteria by which the contingency remedy would be implemented. The Statutory Determinations section should demonstrate how either remedy would fulfill CERCLA section 121 requirements.

NOTICE: The policies set out in this memorandum are intended solely as guidance. They are not intended, nor can they be relied upon, to create any rights enforceable by any party in litigation with the United States. EPA officials may decide to follow the guidance provided in this memorandum, or to act at variance with the guidance, based on an analysis of specific site circumstances. The Agency also reserves the right to change this guidance any time without public notice.

CERCLA Compliance with Other Laws Manual, RCRA ARARs: Focus on Closure Requirements

16

United States Environmental Protection Agency

Office of Solid Waste and Emergency Response

Directive 9234.2-04FS
October 1989

EPA

CERCLA Compliance with Other Laws Manual

RCRA ARARs:

Focus on Closure Requirements

The Superfund Amendments and Reauthorization Act of 1986 (SARA) adopts and expands a provision in the 1985 National Contingency Plan (NCP) that remedial actions must at least attain applicable or relevant and appropriate requirements (ARARs). Section 121(d) of CERCLA, as amended by SARA, requires attainment of Federal ARARs and of State ARARs in State environmental or facility siting laws when the State requirements are promulgated, more stringent than Federal laws, and identified by the State in a timely manner.

To implement the ARARs provision, EPA has developed guidance, CERCLA Compliance with Other Laws Manual: Parts I and II (OSWER Directives 9234.1-01 and 9234.1-02, respectively). EPA is preparing a series of short Fact Sheets (OSWER Directive 9234.2 series) that summarize the guidance documents. This particular Fact Sheet addresses compliance with Subtitle C of the Resource Conservation and Recovery Act (RCRA), as amended by the Hazardous and Solid Waste Amendments of 1984 (HSWA), with a focus on the RCRA Subtitle C closure requirements. This Fact Sheet is based on policies in the proposed December 21, 1988 revisions to the NCP. The final NCP may adopt policies different from those covered here and, when promulgated, should be considered the authoritative source.

I. AN OVERVIEW OF RCRA SUBTITLE C ARARS

The provisions of Subtitle C of RCRA mandate "cradle-to-grave" management of hazardous waste, and regulate three types of hazardous waste handlers: (1) generators; (2) transporters; and (3) owners and operators of treatment, storage, or disposal facilities (TSDFs). Although there are RCRA requirements for generators and transporters of hazardous waste, the most extensive RCRA requirements are those for the design, operation, and closure of hazardous waste TSDFs (40 CFR Part 264). **Highlight 1** shows the types of hazardous waste management units regulated under Subtitle C.

RCRA Subtitle C requirements for TSDFs will frequently be ARARs for CERCLA actions, because RCRA regulates the same or similar wastes as those found at many CERCLA sites, covers many of the same activities, and addresses releases and threatened releases similar to those found at CERCLA sites. When RCRA requirements are ARARs, only the substantive requirements of RCRA must be met if a CERCLA action is to be conducted on site. On-site actions do not require RCRA permits, nor is compliance with administrative requirements necessary for on-site actions. CERCLA actions to be conducted off site, however, must comply with both substantive and administrative RCRA requirements (see **Highlight 2** on the next page).

Highlight 1: KEY SECTIONS OF RCRA

SUBTITLE D Solid Waste Regulations	SUBTITLE C Hazardous Waste Regulations	SUBTITLE I Underground Storage Tank Regulations

Part 264 – Treatment, Storage, and Disposal Facility Requirements

- Subpart F – Ground-water Protection
- Subpart G – Closure and Post-Closure
- Subpart I – Containers
- Subpart J – Tanks
- Subpart K – Surface Impoundments
- Subpart L – Waste Piles
- Subpart M – Land Treatment
- Subpart N – Landfills
- Subpart O – Incinerators
- Subpart X – Miscellaneous Units

Part 268 – Land Disposal Restrictions

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Highlight 2: SUBSTANTIVE AND ADMINISTRATIVE REQUIREMENTS

Substantive Requirements are those requirements that pertain directly to actions or conditions in the environment. Examples include performance standards for incinerators (40 CFR 264.343), treatment standards for land disposal of restricted waste (40 CFR 268), and concentration limits, such as MCLs.

Administrative Requirements are those mechanisms that facilitate the implementation of the substantive requirements of a statute or regulation. Examples include the requirements for preparing a contingency plan, submitting a petition to delist a listed hazardous waste, recordkeeping, and consultations.

A. WHEN RCRA IS APPLICABLE

RCRA Subtitle C requirements for the treatment, storage, and disposal of hazardous waste are applicable for a Superfund remedial action if the following conditions are met:

- The waste is a RCRA hazardous waste, and either:
- The waste was initially treated, stored, or disposed of after the effective date of the particular RCRA requirement, or
- The activity at the CERCLA site constitutes treatment, storage, or disposal, as defined by RCRA.

1. When a CERCLA Waste is a RCRA Hazardous Waste

In order for RCRA requirements to be applicable, a Superfund waste must be determined to be a listed or characteristic hazardous waste under RCRA (see **Highlights 3a** and **3b** for the definition of RCRA hazardous waste). A waste that is hazardous because it once exhibited a characteristic (or media containing a characteristic waste) will not be subject to Subtitle C regulation if it no longer exhibits the characteristic. A listed waste may be delisted if it can be shown that the specific waste is not hazardous based on the standards in 40 CFR 264.22. If such a waste will be shipped off site, it must be delisted through a rulemaking process. However, to delist a RCRA hazardous waste that will remain on site at a Superfund site, only the substantive requirements for delisting must be met (see "ARARs Q's and A's," OSWER Directive 9234.2-01FS, May 1989).

Highlight 3a: CHARACTERISTIC RCRA HAZARDOUS WASTES
(Subpart C of 40 CFR Part 261)

- **Ignitability** - i.e., a waste with a flash point lower than 140 F;
- **Corrosivity** - i.e., a waste with a pH less than or equal to 2.0 or greater than or equal to 12.5, or capable of corroding steel at a rate of more than 0.25 inches per year;
- **Reactivity** - i.e., a waste that is explosive, reacts violently with water, or generates toxic gases when exposed to water or liquids that are moderately acidic or alkaline; and
- **Extraction Procedure (EP) Toxicity*** - i.e., a waste for which the EP test extract contains a concentration of a specified contaminant above its regulatory threshold.

*A final rulemaking is underway that will replace the EP test with the Toxicity Characteristic Leaching Procedure (TCLP). Promulgation is expected in 1990.

Highlight 3b: LISTED RCRA HAZARDOUS WASTES
(Subpart D of 40 CFR Part 261)

- **F Waste Codes** (Part 261.31) - wastes from non-specific sources (e.g., F001 - F005 spent solvents);
- **K Waste Codes** (Part 261.32) - wastes from specific sources (e.g., K001 wastewater treatment sludge from wood preserving processes);
- **P Waste Codes** (Part 261.33(e)) - acutely hazardous commercial chemical products;* and
- **U Waste Codes** (Part 261.34(f)) - toxic commercial chemical products.*

In addition, any solid waste derived from the treatment, storage, or disposal of a listed waste, and any mixture of solid waste and listed waste is a RCRA hazardous waste (regardless of the concentration of hazardous constituents or the percentage of listed wastes in such a mixture).

*NOTE: The word "product" refers to a commercially pure or technical grade of the chemical. A material does not qualify as a product simply because it is a process waste.

Any environmental media (i.e., soil or ground water) contaminated with a listed waste is not a hazardous waste, but must be managed as such until it no longer contains the listed waste, generally when constituents from the listed waste are at health-based levels. Delisting is not required.

To determine whether a waste is a listed waste under RCRA, it is often necessary to know the source of that waste. For any Superfund site, if an affirmative determination cannot be made that the contamination is a RCRA hazardous waste, RCRA requirements will not be applicable. A determination of whether a waste is a characteristic waste can be based on testing the waste. Alternatively, best professional judgment (based on knowledge of the waste and its constituents) can be used to determine whether testing is necessary.

2. When the Date of Initial Disposal Triggers RCRA Applicability

A RCRA requirement will be applicable if the hazardous waste was treated, stored, or disposed of after the effective date of the particular requirement. The RCRA Subtitle C regulations that established the hazardous waste management system first became effective on November 19, 1980. RCRA regulations will not be applicable to wastes disposed of before that date, unless the CERCLA action itself constitutes treatment, storage, or disposal (see below). Additional standards have been issued since 1980; therefore, applicable requirements may vary somewhat, depending on the specific date on which the waste was disposed.

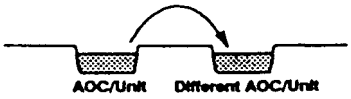
3. When Superfund Activities Trigger RCRA Applicability

RCRA requirements for hazardous wastes will also be applicable if the response activity at the Superfund site constitutes treatment, storage, or disposal, as defined under RCRA. Disposal of hazardous waste, in particular, triggers a number of significant requirements, including closure requirements (see Part II of this Fact Sheet) and land disposal restrictions, which require treatment of wastes prior to land disposal. (See Guides on Superfund Compliance with Land Disposal Restrictions, OSWER Directives 9347.3-01FS through 9237.3-06FS, for a detailed description of these requirements.)

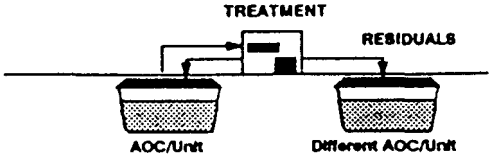
Because remedial actions frequently involve grading, excavating, dredging, or other measures that disturb contaminated material, activities at Superfund sites may constitute disposal, or placement, of hazardous waste (see **Highlight 4**).

Highlight 4: ACTIONS CONSTITUTING DISPOSAL

DISPOSAL OCCURS WHEN:

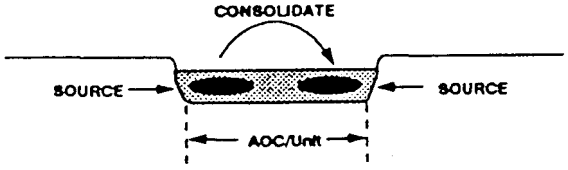


Wastes from different AOCs are consolidated into one unit.



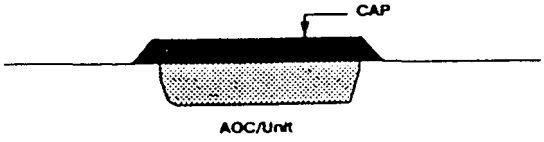
Wastes are removed from the AOC, treated in a separate unit (even if physically within the same AOC), and redeposited into the same or another AOC.

DISPOSAL DOES NOT OCCUR WHEN:



Wastes are consolidated within the same AOC or unit.

Wastes are treated in situ.



Wastes are capped or left in place.

EPA has determined that disposal occurs when wastes are placed in a land-based unit. However, movement within a unit does not constitute disposal or placement, and, at CERCLA sites, an area of contamination (AOC) can be considered to be comparable to a unit. Therefore, movement within an AOC does not constitute placement.

B. WHEN RCRA IS RELEVANT AND APPROPRIATE

RCRA requirements that are not applicable may, nonetheless, be relevant and appropriate, based on site-specific circumstances. For example, if the source or prior use of a CERCLA waste is not identifiable, but the waste is similar in composition to a known, listed RCRA waste, the RCRA requirements may be potentially relevant and appropriate, depending on other circumstances at the site.

However, the similarity of the waste at the CERCLA site to RCRA waste is not the only, nor necessarily the most important, consideration in the determination. An in-depth, constituent-by-constituent analysis is generally neither necessary nor useful, since most RCRA requirements are the same for a given activity or unit, regardless of the specific composition of the hazardous waste.

The determination of relevance and appropriateness of RCRA requirements is based on the circumstances of the release, including the hazardous properties of the waste, its composition and matrix, the characteristics of the site, the nature of the release or threatened release from the site, and the nature and purpose of the requirement itself. Some requirements may be relevant and appropriate for certain areas of the site, but not for other areas. In addition, some RCRA requirements may be relevant and appropriate at a site, while others are not, even for the same waste. For example, minimum technology requirements may be considered relevant and appropriate for one area receiving waste because of the high potential for migration of contaminants in hazardous levels to ground water, but not for another area that contains relatively immobile waste. Land disposal restrictions may be determined not to be relevant and appropriate for either area because the treatment technology required by the requirement is not appropriate, given the matrix of the waste. Only those requirements that are determined to be both relevant and appropriate must be attained.

C. STATE AUTHORIZATION UNDER RCRA

A State may be authorized to administer the RCRA hazardous waste program in lieu of the Federal program provided that the State has equivalent authority. Authorization is granted separately for the basic RCRA Subtitle C program, which includes permitting and closure of TSDFs; for regulations promulgated pursuant to HSWA, such as land disposal restrictions; and for other programs, such as delisting of hazardous wastes. If a site is located in a State with an authorized RCRA program, the State's promulgated RCRA requirements will replace the equivalent Federal requirements as potential ARARs.

An authorized State program may also be more stringent than the Federal program. For example, a State may have more stringent test methods for characteristic wastes, or may list more wastes as hazardous than the Federal program does. Therefore, it is important to determine whether laws in an authorized State go beyond the Federal regulations.

II. FOCUS ON RCRA CLOSURE REQUIREMENTS

For each type of unit regulated under RCRA, Subtitle C regulations contain closure standards that must be met when a unit is closed. For treatment and storage units, the standards require that all hazardous waste and hazardous waste residues be removed when the unit is closed. In addition to the option of closure by removal, called "clean closure," units such as landfills, surface impoundments, and waste piles may be closed as disposal or landfill units with waste in place, referred to as "landfill closure." Frequently, the closure requirements for such land-based units will be either applicable or relevant and appropriate at Superfund sites.

A. WHEN CLOSURE REQUIREMENTS ARE APPLICABLE

The basic prerequisites for applicability of closure requirements are: (1) the waste must be a hazardous waste; and (2) the unit (or AOC) must have received waste after the RCRA requirements became effective, either because of the original date of disposal or because the CERCLA action constitutes disposal (described in Part I of this Fact Sheet). When RCRA closure requirements are applicable, the regulations allow only two types of closure: (1) **clean closure**; and (2) **disposal or landfill closure**.

Highlight 5 provides a description of each type of closure. Clean closure standards assume there will be unrestricted use of the site and require no maintenance after the closure has been completed, and are often referred to as the "eatable solid, drinkable leachate" standards. In contrast, disposal or landfill closure standards require post-closure care and maintenance of the unit for at least 30 years after closure. EPA has prepared several guidance on closure and final covers (e.g., the draft RCRA Guidance Manual for Subpart G, Closure and Post-Closure Standards, EPA-530-SW-78-010, and the technical guidance document, Final Covers on Hazardous Waste Landfills and Surface Impoundments, EPA 530-SW-89-047, July 1989). These guidance documents are not ARARs, but are to be considered (TBC) for CERCLA actions and may assist in complying with these regulations. Of course, the performance standards in the regulation may be attained in ways other than that described in guidance, depending on the specific circumstances of the site.

Highlight 5: REQUIREMENTS FOR CLEAN AND LANDFILL CLOSURE

Clean Closure: All waste residues and contaminated containment system components (e.g., liners), contaminated subsoils, and structures and equipment contaminated with waste and leachate must be removed and managed as hazardous waste or decontaminated before the site management is completed, "edible soil, drinkable leachate" [see 40 CFR 264.111, 264.228(a)].

Landfill Closure: The unit must be capped with a final cover designed and constructed to:

- provide long-term minimization of migration of liquids;
- function with minimum maintenance;
- promote drainage and minimize erosion;
- accommodate settling and subsidence; and
- have a permeability less than or equal to any bottom liner system or natural subsoils present.

Post-closure care includes maintenance of the final cover; operation of a leachate and removal system; and maintenance of a ground-water monitoring system [see 40 CFR 264.117, 264.228(b)].

B. WHEN CLOSURE REQUIREMENTS ARE RELEVANT AND APPROPRIATE

If they are not applicable, RCRA closure requirements may be relevant and appropriate. However, there is more flexibility in designing closures because a hybrid closure is possible. Hybrid closure occurs when only certain requirements in the closure standards are relevant and appropriate. Depending on the site circumstances and the remedy selected, either clean closure, landfill closure, or a combination of both may be used.

The proposed revisions to the NCP discuss the concept of hybrid closure (53 FR 51446). The NCP illustrated the following possible hybrid closure approaches: (1) hybrid-clean closure; and (2) hybrid-landfill closure, which combines elements of clean closure and closure with waste in place, as described in **Highlight 6**.

Highlight 6: HYBRID-CLEAN AND HYBRID-LANDFILL CLOSURES

Hybrid-Clean Closure: Used when leachate will not impact the ground water (even though residual contamination and leachate are above health-based levels) and contamination does not pose a direct contact threat.

- No covers or long-term management are required;
- Fate and transport modeling and model verification are used to ensure that ground water is usable; and
- A property deed notice is used to indicate the presence of hazardous substances.

Hybrid-Landfill Closure: Used when residual contamination poses a direct contact threat, but does not pose a ground-water threat.

- Covers, which may be permeable, are used to address the direct contact threat;
- Limited long-term management includes site and cover maintenance and minimal ground-water monitoring;
- Institutional controls (e.g., land-use restrictions or deed notices) are used as necessary.

The two hybrid closure alternatives are constructs of applicable laws but are not themselves promulgated at this time. These alternatives are possible when RCRA requirements are relevant and appropriate, but are not available when closure requirements are applicable.

AFTERWORD: MINIMUM TECHNOLOGY REQUIREMENTS

While every unit to which RCRA applies must be closed in accordance with RCRA closure requirements (as discussed in Part II of this Fact Sheet), the minimum technology requirements (MTR) apply only to a subset of these regulated units. The MTR require installation of double liners and a leachate collection system, in addition to compliance with other design standards.

The MTR apply only to new units, replacement units,[a] and lateral expansions of existing landfills (40 CFR 254.301(c)) and surface impoundments (40 CFR 254.221(c)).[b,c] Therefore, an existing landfill or AOC would not be subject to MTR, even if disposal of hazardous waste occurred as part of the CERCLA action. The unit or AOC would, however, be subject to RCRA closure standards for landfills. Although not applicable, MTR may be relevant and appropriate depending on the circumstances of the release and the site.

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[a] A replacement unit is further defined as an existing unit that meets the following criteria: (1) the unit is taken out of service; (2) all or substantially all of the waste is removed; and (3) the unit is reused, which does not include removal and replacement of waste into the same unit.

[b] In addition, as of November 19, 1988, existing surface impoundments that actively receive wastes must be retrofitted to comply with MTR (with some limited exceptions).

[c] LDR requires that certain restricted wastes, such as soft hammer wastes, be disposed of in a unit that meets MTR, and therefore can trigger MTR indirectly (see Superfund LDR Guide #3, OSWER Directive 9347.3-03FS).

Consideration of RCRA Requirements in Performing CERCLA Responses at Mining Waste Sites

17

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

9234.0-4

AUG 19 1986

OFFICE OF
SOLID WASTE AND EMERGENCY RESPC

MEMORANDUM

SUBJECT: Consideration of RCRA Requirements in Performing CERCLA Responses at Mining Waste Sites

FROM: Henry L. Longest II, Director
Office of Emergency and Remedial Response

Walter W. Kovalick, Jr. for

TO: Waste Management Division Directors
Regions I - X

As you know, on July 3, 1986, the Agency issued a final determination on whether mining waste would be regulated under Subtitle C of RCRA (copy attached). This determination was based on a report to Congress mandated by RCRA Section 3001(b)(3)(C) and subsequent public comments. The determination is that mining wastes will not be regulated under Subtitle C at this time. This conclusion is based on the belief that several aspects of EPA's current hazardous waste management standards if applied universally to mining sites, are likely to be environmentally unnecessary, technically infeasible, or economically impractical.

However, given the concern about actual and potential mining waste problems, the Agency intends to develop a program for regulating mining waste under Subtitle D. The current Subtitle D program establishes criteria principally aimed at municipal and industrial solid waste which focus on standards related to surface water discharges, groundwater contamination and endangered species. Modifications to this program will focus on identifying environmental problems, setting priorities for applying controls at sites with a high potential for risk, and employing a risk management approach in the development of appropriate standards to protect human health and the environment, as necessary, including closure options, tailored controls, pretreatment of wastes prior to disposal, and cleanup options. Revisions to Subtitle D criteria are expected to be proposed in mid-1988; however, EPA has reserved the option to reexamine a modified Subtitle C in the future if this approach is unworkable or insufficient.

In the interim, Superfund will continue to address mining waste problems through the RI/FS and ROD/EDD processes taking into account current Subtitle D requirements as well as options for addressing risks not addressed by Subtitle D requirements. To address such remaining risks, you may wish to consider the technical requirements of Subtitle C regulations during the initial review of remedial alternatives. If these requirements seem to be technically infeasible, they may be rejected early in the screening process. If Subtitle C approaches appear to satisfy the criteria found in Section 300.68 (g), Initial Screening of Alternatives, of the NCP, they should be considered in the detailed analysis. Other remedial alternatives should be evaluated in a risk management analysis. In some cases, a combination of Subtitle C and risk analysis approaches may be used to address a discrete phase of response. All data generated during remedial planning, including the basis for selection of specific remedies, should be forwarded to my office as it becomes available so that the information can be transmitted to OSW to assist that office in its development of standards for mining wastes.

Attachment

cc: Marcia Williams, OSW
Gene Lucero, OWPE
Dan Berry, OGC

Environmental Protection Agency

40 CFR Part 261

Regulatory Determination For Wastes From the Extraction and Beneficiation of Ores and Minerals

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 261

[FRL 3033-7]

Regulatory Determination for Wastes from the Extraction and Beneficiation of Ores and Minerals

AGENCY: Environmental Protection Agency.

ACTION: Regulatory determination.

SUMMARY: This is the regulatory determination for solid waste from the extraction and beneficiation of ores and minerals required by section 3001(b)(3)(C) of the Resource Conservation and Recovery Act (RCRA). This section of RCRA requires the Administrator to determine whether to promulgate regulations under Subtitle C of the Act for these wastes or determine that such regulations are unwarranted; the Administrator must make this determination no later than six months after completing a Report to Congress on these wastes and after public hearings and the opportunity to comment on the report. After completing these activities and reviewing the information available, the Agency has determined that regulation of the wastes studied in the Report to Congress, i.e., wastes from the extraction and beneficiation of ores and minerals, under Subtitle C is not warranted at this time.

ADDRESS: The address for the Headquarters docket is: United States Environmental Protection Agency, EPA RCRA docket (Sub-basement), 401 M street, SW., Washington DC, 20460, (202) 475-9327. For further details on what the EPA RCRA docket contains, see Section VII. of this preamble, titled "EPA RCRA Docket" under "SUPPLEMENTARY INFORMATION.".

FOR FURTHER INFORMATION CONTACT: RCRA/Superfund Hotline at (800) 424-9346 or (202) 382-3000 or Dan Derkics at (202) 382-2791.

SUPPLEMENTARY INFORMATION:

Preamble Outline

I. Summary of Decision

II. Background

III. Legal Authority

IV. Report to Congress

V. Application of Subtitle C to Mining Waste

VI. Application of Subtitle D to Mining Waste

VII. EPA RCRA Docket

Supplementary Information

I. Summary

Based on the Report to Congress, comments on the report, and other available information, EPA has determined that regulation of mining waste under Subtitle C of the Resource Conservation and Recovery Act (RCRA) is not warranted at this time.

This conclusion is based on EPA's belief that several aspects of EPA's current hazardous waste management standards are likely to be environmentally unnecessary, technically infeasible, or economically impractical when applied to mining waste. While under existing law EPA would have some flexiblity to modify its standards for hazardous waste management as applied to these wastes, there are substantial questions about whether the flexibility inherent in the statute coupled with the Agency's current data on these wastes provide a sufficient basis for EPA to develop a mining waste program under Subtitle C that addresses the risks presented by mining waste while remaining sensitive to the unique practical demands of mining operations. Given these uncertainties, EPA does not intend to impose Subtitle C controls on mining waste at this time.

The Agency, however, is concerned about certain actual and potential mining waste problems, and therefore plans to develop a program for mining waste under Subtitle D of RCRA. The long-term effectiveness of this program depends on available State resources for designing and implementing a program tailored to the needs of each State, and on EPA's ability to oversee and enforce the program. As noted below in section VI, EPA will be working with the States to determine the specific nature of their current mining waste activities and

their future plans to administer such programs. The Administration will work with Congress to develop expanded Subtitle D authority (i.e., Federal oversight and enforcement) to support an effective State-implemented program for mining waste. EPA has already made preliminary contacts with Congress and intends to hold detailed discussions on the specifics of the Subtitle D program in the coming year. In the interim, EPA will use RCRA section 7003 and CERCLA sections 104 and 106 to protect against substantial threats and imminent hazards. If EPA is unable to develop an effective mining waste program under Subtitle D, the Agency may find it necessary to use Subtitle C authority in the future.

II. Background

Section 8002(f) of the Resource Conservation and Recovery Act of 1976 directed EPA to conduct:

A detailed and comprehensive study on the adverse effects of solid wastes from active and abandoned surface and underground mines on the environment, including, but not limited to, the effects of such wastes on humans, water, air, health, welfare, and natural resources, and on the adequacy of means and measures currently employed by the mining industry, Government agencies, and others to dispose of and utilize such solid wastes to prevent or substantially mitigate such adverse effects.

The study was to include an analysis of:

1. The Sources and volume of discarded material generated per year from mining;

2. Present disposal practices;

3. Potential danger to human health and the environment from surface runoff of leachate and air pollution by dust;

4. Alternatives to current disposal methods;

5. The cost of those alternatives in terms of the impact on mine product costs; and

6. Potential for use of discarded material as a secondary source of the mine product.

On May 19, 1980, EPA promulgated regulations under Subtitle C of RCRA which covered, among other things, "solid waste from the extraction, beneficiation, and processing of ores and minerals," i.e., mining waste. On October 21, 1980, just before these Subtitle C regulations became effective, Congress enacted the Solid Waste Disposal Act of 1980 (Pub. L. 96-482) which added

section 3001(b)(3)(A)(ii) to RCRA. This section prohibits EPA from regulating "solid waste from the extraction, beneficiation, and processing of ores and minerals, including phosphate rock and overburden from the mining of uranium ore" as hazardous waste under Subtitle C of RCRA until at least six months after the Agency completes and submits to Congress the studies required by section 8002(f), and by section 8002(p) (which was also added to RCRA by the 1980 amendments).

Section 8002(p) required EPA to perform a comprehensive study on the disposal and utilization of the waste excluded from regulation, i.e., solid waste from the extraction, beneficiation, and processing of ores and minerals, including phosphate rock and overburden from the mining of uranium ore. This new study, to be conducted in conjunction with the section 8002(f) study, mandated an analysis of:

1. The source and volumes of such materials generated per year;

2. Present disposal and utilization practices;

3. Potential danger, if any, to human health and the environment from the disposal and reuse of such materials;

4. Documented cases in which danger to human health or the environment has been proved;

5. Alternatives to current disposal methods;

6. The costs of such alternatives;

7. The impact of these alternatives on the use of phosphate rock and uranium ore, and other natural resources; and

8. The current and potential utilization of such materials.

The 1980 amendments also added section 3001(b)(3)(C), which requires the Administrator to make a "regulatory determination" regarding the waste excluded from Subtitle C regulation. Specifically within six months after submitting the Report to Congress, and after holding public hearings and taking public comment on the report, the Administrator must "determine to promulgate regulations" under Subtitle C of RCRA for mining waste or "determine that such regulations are unwarranted."

EPA was required to complete the study and submit it to Congress by October 16, 1983. In 1984, the Concerned Citizens of Adamstown and the Environmental Defense Fund sued EPA for failing to complete the section 8002 studies and the regulatory determination by the statutory deadlines. The District Court for the District of Columbia ordered EPA to complete the studies by December 31, 1985, and to publish the regulatory determination by June 30, 1986.

EPA submitted its Report to Congress on mining waste on December 31, 1985. A notice announcing the availabilityof the report, and the dates and locations of public hearings, was published January 8, 1986 (51 FR 777). EPA held public hearings on the report in Tucson, Arizona on March 6, 1986; Washington, DC on March 11, 1986; and Denver, Colorado on March 13, 1986. The comment period on the report closed March 31, 1986. This notice constitutes the Agency's regulatory determination for the wastes covered by the Report to Congress, i.e., wastes from the extraction and beneficiation of ores and minerals.

On October 2, 1986, EPA proposed to narrow the scope of the mining waste exclusion in RCRA section 3001(b)(3)(A)(ii), as it applies to processing wastes (50 FR 40292). Under this proposal, wastes that would no longer be covered by the mining waste exclusion would be subject to Subtitle C if they are hazardous. These "reinterpreted" wastes where not studied in the mining waste Report to Congress and therefore, are not covered by this regulatory determination.

III. Legal Authority

EPA has concluded that its decision whether to regulate mining waste under Subtitle C should be based not just on whether mining waste is hazardous (as currently defined by EPA regulations) but also should consider the other factors that section 8002 required EPA to study. The basis of this conclusion is the language of section 3001(b)(3)(A) which states that the regulatory determination must be "based on information developed or accumulated pursuant to [the section 8002 studies], public hearings, and comment. . . ." Clearly, Congress envisioned that the determination would be based on all the factors enumerated in sections 8002 (f) and (p). Congress already knew that some mining waste was hazardous, since the RCRA Subtitle C regulations which were promulgated on May 19, 1980 were to apply to hazardous (both characteristic and listed) mining waste. Congress apparently believed, however, that EPA should obtain and consider additional information, not just data on which types of mining waste are hazardous, before imposing Subtitle C regulation on these wastes. Accordingly, this regulatory determination is based on consideration of the factors listed in sections 8002 (f) and (p).

In reviewing the factors to be studied which are listed in sections 8002 (f) and (p), and the legislative history of these and other mining waste provisions, EPA has concluded that Congress believed that certain factors are particularly important to consider in making the Subtitle C regulatory determination. First, Congress instructed EPA to study the potential dangers to human health and the environment from mining waste, indicating that the decision to regulate under Subtitle C must be based on a finding of such a danger. Second, section 8002(p) required EPA to review the actions of other Federal and State agencies which deal with mining waste "with a view toward avoiding duplication of effort." From this provision, EPA concludes that Congress believed Subtitle C regulation might not be necessary if other

Federal or State programs control any risks associated with mining waste. Third, Congress expected EPA to analyze fully the disposal practices of the mining industry which, when read in conjunction with the legislative history of this provision, indicates concern about the feasibility of Subtitle C controls for mining waste. Finally, Congress instructed EPA to look at the costs of various alternative methods for mining waste management, as well as the impact of those alternatives on the use of natural resources. Therefore, EPA must consider both the cost and impact of any Subtitle C regulations in deciding whether they are warranted. Clearly, Congress believed that it was important to maintain a viable mining industry. Therefore, any Subtitle C regulations which would cause widespread closures in the industry would be unwarranted.

IV. Report to Congress

EPA's Report to Congress provides information on sources and volumes of waste, disposal and utilization practices, potential danger to human health and the environment from mining practices, and evidence of damages. EPA received more than 60 written comments on the report and heard testimony at the hearings from more than 30 individuals. A complete summary of all the comments presented at the hearings and submitted in writing is available (ICF, 1986a see VII No. 6); (see "EPA RCRA Docket"). This section summarizes the information contained in the Report to Congress, public comments received on the report, and EPA's response to the comments.

A. Summary of Report to Congress

1. Structure and Location of Mines

EPA focused on segments producing and concentrating metallic ores, phosphate rock, and asbestos, totalling fewer than 500 active sites during 1985. These sites, which are predominantly located in sparsely populated areas west of the Mississippi River, vary widely in terms of size, product value, and volumes of material handled. Several segments are concentrated primarily in one state: The iron segment is mainly concentrated in Minnesota, lead in Missouri, copper in Arizona, asbestos in California, and phosphate in Florida.

2. Waste Quantities

The Report to Congress estimated that 1.3 and 2 billion metric tons per year of nonfuel mining waste were generated in 1982 and 1980, respectively. The accumulated waste volume since 1910 from nonfuel mining is estimated to be approximately 50 billion metric tons. The large volume of annual and accumulated nonfuel mining waste results from the high waste-to-product ratios associated with mining. The fact that most of the material handled in mining is waste and not marketable product distinguishes mining from many other process industries where waste materials make up a relatively small portion of the materials used to produce a final product. Consequently, some of the

larger mining operations handle more material and generate more waste than many entire industries.

3. Waste Management Practices

The report indicated that site selection for mines, as well as associated beneficiation and waste disposal facilities, is the single most important factor affecting environmental quality in the mining industry. Most mine waste is disposed of in piles, and most tailings in impoundments. Mine water is often recycled through the mill and used for other purposes onsite. Off-site utilization of mine waste and mill tailings is limited (i.e., 2 to 4 percent of all mining waste generated). Some waste management measures (e.g., source separation, treatment of acids or cyanides, and waste stabilization) now used at some facilities within a narrow segment of the mining industry could be more widely used. Other measures applied to hazardous waste in nonmining industries may not be appropriate. For example, soil cover from surrounding terrain may create additional reclamation problems in arid regions.

4. Potential Hazard Characteristics

Of the 1.3 billion metric tons of nonfuel mining waste generated by extraction and beneficiation in 1985, about 61 million metric tons (5 percent) exhibit the characteristics of corrosivity and/or EP (Extraction Procedure) toxicity, as defined by 40 CFR 261.22 and 261.24, respectively. Another 23 million metric tons (2 percent) are contaminated with cyanide (greater than 10 mg/1). Further, there are 182 million metric tons (14 percent) of copper leach dump material and 95 million metric tons (7 percent) of copper mill tailings with the potential for release of acidic and toxic liquid, i.e., acid formation. There are 443 million metric tons (34 percent) of waste from the phosphate and uranium segments with radioactivity content greater than 5 picocuries per gram; a total of 93 million metric tons (7 percent) has radioactivity content greater than 20 picocuries per gram. Finally, asbestos mines generated about 5 million metric tons (less than 1 percent) of waste with a chrysotile content greater than 5 percent.

5. Evidence of Damages

To determine what damage might be caused by mining waste, EPA conducted ground-water monitoring and examined documented damage cases. During short-term monitoring studies at eight sites, EPA detected seepage from tailings impoundments, a copper leach dump, and a uranium mine water pond. The

EP toxic metals of concern, however, did not appear to have migrated during the 6- to 9-month monitoring period. Other ground-water monitoring studies, however, detected sulfates, cyanides, and other contaminants from mine runoff, tailings pond seepage, and leaching operations. The actual human health and environmental threat posed by any of these releases is largely dependent upon site-specific factors, including a site's proximity to human populations or

sensitive ecosystems. Sites well removed from population centers, drinking water supplies, and surface waters are not likely to pose high risks.

Incidents of damage (e.g., contamination of drinking water aquifers, degradation of aquatic ecosystems, fish kills, and related degradation of environmental quality) have also been documented in the phosphate, gold, silver, copper, lead, and uranium segments. As of September 1985, there were 39 extraction, beneficiation, and processing sites included or proposed for inclusion on the National Priorities List under CERCLA (Superfund), including five gold/siver, three copper, three asbestos, and two lead/zinc mines. The asbestos Superfund sites differ from other sites in that these wastes pose a hazard via airborne exposure.

6. Potential Costs of Regulation

The Report to Congress presented for five metal mining segments, total annualized costs ranging from $7 million per year (for a scenario that emphasizes primarily basic maintenance and monitoring for wastes that are hazardous under the current RCRA criteria) to over $800 million per year (for an unlikely scenario that approximates a full RCRA Subtitle C regulatory approach, emphasizing cap and liner containment for all wastes considered hazardous under the current criteria, plus cyanide and acid formation wastes). About 60 percent of the total projected annualized cost at active facilities can be attributed to the management of waste accumulated from past production. Those segments with no hazardous waste (e.g., iron) would incur no costs. Within a segment, incremental costs would vary greatly from facility to facility, depending on current requirements of state laws, ore grade, geography, past waste accumulation, percentage of waste which is hazardous, and other factors.

B. Comments Received on the Report to Congress and EPA's Response

1. Potential Hazard Characteristics

EPA received several comments addressing the magnitude of the wastes generated by the mining industry, and the amount that is hazardous. Many agreed with the report's conclusion that there are substantial volumes of waste, but questioned EPA's estimates of the amount of "hazardous" waste.

Many commenters noted that they believed the EP (Extraction Procedure) test is inappropriate for mining waste because the municipal landfill mismangement scenario on which the test is based is not relevant to mining waste. They further noted that the corrosivity characteristic is not appropriate because it does not address the buffering capacity of the environment at certain mining sites. Finally, several commenters noted that leaching operations are processes, rather than wastes and are thus outside the purview of RCRA.

The Agency agrees that dump and heap leach piles are not wastes; rather they are raw materials used in the production process. Similarly, the leach liquor that is captured and processed to recover metal values is a product, and not a waste. Only the leach liquor which escapes from the production process and abandoned heap and dump leach piles are wastes. Since the report identified 50 million metric tons of heap and dump leach materials as RCRA corrosive wastes, EPA has accordingly reduced its estimate of mining waste volumes which meet the current definition of hazardous waste. The Agency currently estimates that out of the 61 million metric tons per year of mining waste identified as hazardous in the Report to Congress, only 11 million metric tons of mining waste generated annually are hazardous because they exhibit EP toxicity, and an unknown amount of escaped leach liquor is corrosive. EPA has also concluded that potential problems from substantial quantities of mining waste which have other properties, i.e., radioactivity, asbestos, cyanide, or acid generation potential will not be identified by the current RCRA characteristics. EPA, therefore, believes that entirely different criteria may more appropriately identify the mining wastes most likely to be of concern.

2. Evidence of Damages

EPA received many comments on whether the Report to Congress demonstrates that mining waste pose a threat to human health and the environment. Many commenters alleged that the report does not demonstrate conclusively that such wastes do pose a threat. They claimed that EPA did not adequately consider the site-specific nature of mining waste management problems. They pointed out that the environmental settings of sites vary widely, as do management practices, and that all these factors influence risk. Also, several commenters noted that the report fails to distinguish between the threat from past practices and the threat, if any, from current practices. Based on these observations, many of these commenters urged EPA to postpone regulations pending additional analysis. However, other commenters noted that they believed there is sufficient evidence that mining waste poses a threat to human health and the environment and asked for immediate regulatory action, noting that the time for study was over.

The Agency agrees that adverse effects to the public and the environment from the disposal of mining waste is not likely at sites well-removed from population centers, drinking water supplies, surface water, or other receptors. However, for other sites, analyses of contaminant plumes released by leaching operations and releases of other contaminants (e.g., acids, metals, dusts, radioactivity) demonstrate adverse effects. Moreover, the Agency recognizes, as evidenced by the mining waste sites on the National Priorities List, the potential for problems from mining sites. It is apparent that some of the problems at Superfund or other abandoned sites are attributable to waste disposal practices not currently used by the mining industry. However, it is not clear from the analysis of damage cases and Superfund sites, whether current waste management practices can prevent damage from seepage or sudden releases. EPA is concerned that a large exposure

potential exists at some sites generating mining waste, particularly the sites that are close to population centers or in locations conducive to high exposure and risk to human health and the environment.

3. Potential Costs of Regulation

EPA received a large number of comments pertaining to the cost of complying with regulations for mining waste, and the effects these compliance costs would have on the mining industry. Many commenters claimed that regulating the mining industry would impose costs much greater than those EPA estimated in its Report to Congress. They also noted that the mining industry was depressed, and that for many mines, increased compliance costs would be greater than the profits, leading to forced closures.

Many commenters also pointed out that there are current Federal and State regulations which already apply to mining, which impose costs. They noted that EPA needs to review the existing Federal and State regulatory structure before adding to it, thereby imposing additional costs. Others did not agree, commenting that existing Federal and State regulations are inadequate, and that additional EPA regulation is necessary.

EPA is sensitive to the potential costs to the industry associated with mining waste regulations under Subtitle C. The Agency is also cognizant that many EPA programs already affect the mining industry such as the Clean Water Act which, among other things, control surface water discharge via national Pollutant Discharge Elimination system (NPDES) permits. Other Federal agencies, including the Bureau of Land Management, the Forest Service, and the National Park Service, also exercise oversight and impose regulatory controls (CRA, 1986b see VII no. 3). The Federal waste disposal requirements generally call for practices that will prevent unnecessary and undue degradation. Federal reclamation guidelines are somewhat more detailed, requiring approval of a land management operating plan and an environmental assessment. Also these agencies generally require compliance with all applicable state and local laws and ordinances.

A number of states have their own statutes and implementing regulations for mining waste. Some states have comprehensive and well-integrated programs; other States have newer, partially developed programs (CRA, 1986c see VII no. 4). Although there is great variation in programs, many states have siting and permitting requirements, and require financial assurance, ground-water and surface water protection, and closure standards. EPA agrees that any requirements necessary to protect human health and the environment should consider the existing Federal and State mining waste programs with a view toward avoiding duplication of effort.

C. Mining Waste Conclusions

Based on the available information and public comments, the Agency draws the following conclusions about mining wastes. (BAI, 1986 see VII No. 1)

Source and Volume

- The waste volume generated by mining and beneficiation is considerably larger than the volume of waste generated by other industries currently subject to hazardous waste controls. The mining industry alone generates over one billion metric tons of waste per year compared to 260 million metric tons generated annually by all other hazardous waste industries. The average mining waste facility manages about three million metric tons of waste annually while the typical facility subject to Subtitle C controls manages about 50 thousand metric tons of waste per year.

- In general, mining waste disposal facilities are considerably larger than industrial hazardous waste disposal facilities; most of the largest industrial hazardous waste land disposal facilities are (tens of acres) in size, while typical mining waste disposal facilities are (hundreds of acres) in size. Agency studies indicate that mining waste tailings impoundments average about 500 acres; the largest is over 5000 acres. Mining waste piles average 126 acres; the largest exceeds 500 acres. Hazardous waste impoundments, however, average only about 6 acres and hazardous waste landfills average only about 10 acres. Consequently, EPA believes that many traditional hazardous waste controls may be technically infeasible or economically impractical to implement at mining waste sites because of their size.

Waste Management Practices

- EPA estimates indicate that most hazardous waste generators (about 70 percent) ship all of their waste off-site, however, no mines ship all of their waste off-site. In addition, nearly all mining waste is land disposed, while less than half of all industrial hazardous waste is land disposed.

Evidence of Damage

- In general, environmental conditions and exposure potential associated with mining waste are different than those associated with industrial hazardous waste streams. Agency studies suggest that mining waste streams generally have lower exposure and risk potential for several reasons.

- First, mining waste management facilities are generally in drier climates than hazardous waste management facilities, thereby reducing the leaching potential. Over 80 percent of the mining sites are located west of the Mississippi River, which generally has drier climates, whereas industrial hazardous waste landfills are more evenly distributed nationally. In addition, the Agency estimates that more than sixty percent of all mines have annual net

recharge between 0-2 inches, and only ten percent have net recharge greater than ten inches. However, about 80 percent of the hazardous waste land disposal facilities have net recharge greater than five inches, and over one-third exceed 15 inches.

- Second, EPA studies indicate that hazardous waste land disposal facilities are closer to ground water than mining waste sites. Over 70 percent of hazardous waste sites have a depth to ground water of 30 feet or less, while about 70 percent of mining sites have ground water depths greater than 30 feet.

- Third, Subtitle C facilities tend to be located in more densely populated areas. EPA estimates that mining waste sites have average populations of less than 200 within one mile of the site, while hazardous waste sites average over 2,000 people at the same distance. Within five miles of the mining waste sites, the average population is almost 3,000, while hazardous waste sites average nearly 60,000 people.

- Fourth, Agency studies suggest that, compared to mining waste sites, hazardous waste sites tend to be located closer to drinking water receptors and serve larger populations. Almost 70 percent of the hazardous waste sites are located within five miles of a drinking water receptor serving an average population of over 18,000 and as many as 400,000 people. Almost half as many mining sites are located within this same distance, and they serve considerably smaller populations (averaging 3,000 but ranging as high as 20,000.)

- Although the Agency believes that the human exposure and risk potential appears to be lower for mining waste sites than for industrial hazardous waste sites, many mines are located in sensitive environmental settings. EPA estimates that about 50 percent of the mines are located in areas that have resident populations of threatened or endangered species or species of other special concern, (often the case for industrial sites). In addition, mining sites are typically located in relatively remote and otherwise undisturbed natural environments.

Cost and Economic Impacts

- EPA believes that many traditional waste management controls designed principally for industrial hazardous waste management facilities may be economically impractical to implement at mining sites and could impose substantial costs to the industry resulting in potential mine closures. Full Subtitle C controls for mining sites could impose as much as $850 million per year in compliance costs. Such costs could be greater than profits resulting in mine closures.

- Many Federal and State agencies already have regulatory programs for managing mining waste. New hazardous waste controls for mining waste could be difficult to integrate with existing Federal and State programs.

V. Application of Subtitle C to Mining Waste

EPA believes that it needs maximum flexibility to develop an appropriate program for mining waste which addresses the technical feasibility, the environmental necessity, and the economic practicality of mining waste controls. The program should consist of a tailored risk-based approach which addresses the diversity and unique characteristics of mining waste problems.

The current Subtitle C program is designed principally for controlling problems created by industrial wastes. Based on information available, the Agency believes that many controls required under the current Subtitle C program, if applied universally to mining sites, would be either unnecessary to protect human health and the environment, technically infeasible, or economically impractical to implement. For instance, certain Subtitle C requirements such as single and double liner system requirements which provide liquid management, and closure and capping standards to minimize infiltration, may be technically infeasible or economically impractical to implement for mining wastes because of the quantity and nature of waste involved. In addition, for many mining sites located in remote areas, such controls may be necessary to protect human health and the environment. For example, liquid releases to the ground water can be minimized and controlled using cutoff walls or interceptor wells (i.e., controlled release) as well as through liner systems, and alternate capping requirements designed to address site-specific concerns such as direct human contact or wind erosion, are likely to be feasible and practical, thus providing better long-term protection of human health and the environment.

Section 3004(x) of RCRA does provide flexibility for regulating mining waste. This section gives EPA the authority to modify certain Subtitle C requirements for mining waste which were imposed by the Hazardous and Solid Waste Amendments of 1984 (HSWA) which relate to liquids in landfills, prohibitions on land disposal, minimum technological requirements, continuing releases at permitted facilities, and retrofitting interim status surface impoundments with liners. In modifying these requirements, EPA may consider site-specific characteristics as well as the practical difficulties associated with implementing such requirements. In addition, EPA has general authority under RCRA section 3004(a) to modify remaining Subtitle C requirements, such as administrative standards, financial requirements, and closure and capping requirements, if a waste poses different risks or the existing standards are technically infeasible. However, in modifying such requirements, section 3004(a) does not provide EPA the same degree of flexibility to consider the economic impact of regulation that is found in section 3004(x).

As described earlier in this notice, EPA believes that the decision whether to regulate mining waste under Subtitle C must consider the factors listed in RCRA sections 8002 (f) and (p), including the risks associated with mining waste, the cost of such regulation, and the effect regulation might have on the use of natural resources. EPA has concluded that in order to meet that objective, it would want to develop a program that has maximum flexibility to develop an effective control strategy for individual facilities based on site-specific conditions. The existing Subtitle C regulatory program would probably have to be changed substantially for mining waste to provide that type of flexibility.

Given these general conclusions about what would be needed to make the Subtitle C system appropriate for mining waste, there are substantial uncertainties about whether that program is the right mechanism to address mining waste. First, it is unclear whether the legal authorities under which EPA would be acting (i.e., sections 3004(a) and 3004(x)) give EPA sufficient flexibility to craft a program for "hazardous" mining waste given the statutory and regulatory approach established for other hazardous wastes. Second, and closely related, there are substantial questions about whether the Agency's current data on mining waste management provide a basis for substantial modifications to the existing Subtitle C regulatory program. With the mining waste study and the supplementary information collection efforts associated with today's notice, EPA has greatly expanded its understanding of mining waste management practices. At the same time, additional data collection and analysis would probably be necessary to support specific modifications of multiple provisions in the existing hazardous waste regulations before those regulations would provide the type of flexibility we currently believe might be necessary. These uncertainties have led us to the conclusion that Subtitle C does not provide an appropriate template for a mining waste management program.

VI. Application of Subtitle D to Mining Waste

Solid waste that is not hazardous waste is subject to regulation under Subtitle D. Therefore, mining waste, which is included in the RCRA definition of solid waste, is currently covered by Subtitle D. EPA believes that it can design and implement a program specific to mining waste under Subtitle D that addresses the risks associated with such waste. The current Subtitle D program establishes criteria which are, for the most part, environmental performance standards that are used by States to identify unacceptable solid waste disposal practices or facilities. (See 40 CFR Part 257.) These criteria include, among other things, standards related to surface water discharges, ground-water contamination, and endangered species. Because the program's criteria are aimed principally at municipal and industrial solid waste, EPA believes they do not now fully address mining waste concerns. In addition, many of these criteria, such as control of disease vectors and bird hazards, are not appropriate for mining waste.

The Agency is currently revising these criteria for facilities that may receive hazardous household waste and small quantity generator hazardous waste; these revisions will not apply to mining waste which are generally not codisposed with such wastes. However, the Agency intends to further augment the Subtitle D program by developing appropriate standards and taking other actions appropriate for mining waste problems. EPA will focus on identifying environmental problems and setting priorities for applying controls at mining sites with such potential problems as high acid-generation potential, radioactivity, asbestos and cyanide wastes. EPA will also develop a risk-management framework to develop appropriate standards as necessary to protect human health and the environment. EPA will consider requirements such as: (1) A range of closure options to accommodate variable problems such as infiltration to ground water and exposure from fugitive dust; (2) options to define tailored controls, including those established by the Clean Water Act, to address problems from runoff to surface water; (3) options for liquid management controls such as pretreatment of wastes prior to disposal, controlled release, or liner systems; (4) ground-water monitoring options that accommodate site-specific variability; and (5) a range of clean-up options.

In developing such a program, EPA will use its RCRA Section 3007 authority to collect additional information on the nature of mining waste, mining waste management practices, and mining waste exposure potential. EPA believes this authority does not limit information collection to "hazardous" waste identified under Subtitle C but also authorizes the collection of information on any solid waste that the Agency reasonably believes may pose a hazard when improperly managed. (EPA may also use this authority in preparing enforcement actions.) Initially, EPA will use this information to develop a program under Subtitle D. The information, however, may indicate the need to reconsider Subtitle C for certain mining wastes.

In specifying the appropriate standards, EPA also will further analyze existing Federal and State authorities and programs and determine future plans for administering their mining waste programs. Additionally, EPA will perform analyses of costs, impacts, and benefits and will comply fully with Executive Orders 12291 and 12498, the Regulatory Flexibility Act, and the Paperwork Reduction Act.

EPA is concerned that the lack of Federal oversight and enforcement authority over mining waste controls under Subtitle D of RCRA and inadequate State resources to develop and implement mining waste programs may jeopardize the effectiveness of the program. The Administration therefore will work with Congress to develop the necessary authority. In the interim, EPA will use section 7003 of RCRA and sections 104 and 106 of CERCLA to seek relief in those cases where wastes from mining sites pose substantial threats or imminent hazards to human health and the environment. Mining waste problems can also be addressed under RCRA Section 7002 which authorizes citizen lawsuits for violations of Subtitle D requirements in 40 CFR Part 257.

As EPA develops this program for regulating human health and environmental risks associated with mining waste, the Agency may find that the Subtitle D approach is unworkable, perhaps because there is insufficient authority to implement an effective program (i.e., the Agency does not obtain oversight and enforcement authority under Subtitle D), or that States lack adequate resources to develop and implement the program. In such an event, EPA may find it necessary to reexamine use of Subtitle C authority with modified mining waste standards in the future.

EPA has already made preliminary contacts with Congress to discuss the best approach for an effective mining waste program. The Agency intends to immediately begin collecting additional technical, economic, and other relevant information needed for program development, and to complete its data analysis by late 1987. EPA hopes to propose revisions to the Subtitle D criteria that are specific to mining waste by mid-1988.

VII. EPA RCRA Docket

The EPA RCRA docket is located at:

United States Environmental Protection Agency,
EPA RCRA Docket (Sub-basement),
401 M Street, SW.,
Washington, DC 20460.

The docket is open from 9:30 to 3:30 Monday through Friday, except for Federal holidays. The public must make an appointment to review docket materials. Call Mia Zmud at (202) 475-9327 or Kate Blow at (202) 382-4675 for appointments.

Copies of the following documents are available for viewing only in the EPA docket room:

1. Buc & Associates Inc., 1986. Location of Mines and Factors Affecting Exposure.

2. Charles River Associates, 1986a. Estimated Costs to the U.S. Uranium and Phosphate Mining Industry for Management of Radioactive Solid Wastes.

3. Charles River Associates, 1986b. Federal Non-EPA Regulations Addressing Mining Waste Practices.

4. Charles River Associates, 1986c. State Regulations of the U.S. Mining Industry.

5. Frontier Technical Associates, 1986a. Groundwater Monitoring Data on Ore Mining and Milling Solid Waste Disposal.

6. ICF, 1986a. Summary of Comments on the Report to Congress.

7. ICF, 1986b. Overview of Superfund Mine Sites.

8. Meridian 1986. Statistical Analysis of Mining Waste Data.

9. Versar, 1986a. Quantities of Cyanide-bearing and Acid-Generating Wastes.

10. Versar, 1986b. Technical Studies Supporting the Mining Waste Regulatory Determination.

The public may copy a maximum of 50 pages of material from any one regulatory docket at no cost. Additional copies cost $.20/page.

Dated: June 30, 1986.

Lee M. Thomas,

Administrator.

[FR Doc. 86-15168 Filed 7-2-86; 8:45 am]

BILLING CODE 6560-50-M

Policy for Superfund Compliance with the RCRA Land Disposal Restrictions

18

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

APR 17 1989

OFFICE OF
SOLID WASTE AND EMERGENCY RESPONSE

OSWER Directive 9347.1-02

MEMORANDUM

SUBJECT: Policy for Superfund Compliance With the RCRA Land Disposal Restrictions

FROM: Jonathan Z. Cannon
Acting Assistant Administrator

TO: Regional Administrators, Regions I-X

Purpose

To transmit the Superfund policy for complying with the RCRA land disposal restrictions (LDRs) at Superfund sites.

Background

CERCLA section 121(d) requires on-site Superfund remedial actions to comply with Federal, and more stringent State, environmental requirements that are determined to be applicable or relevant and appropriate requirements (ARARs). Section 121 also identifies six ARAR waivers: 1) interim remedy; 2) greater risk to human health and the environment; 3) technical impracticability; 4) equivalent standard of performance; 5) inconsistent application of State standard; and 6) Fund-balancing.

With regard to Superfund removal actions, the current NCP requires on-site removal actions to comply with Federal ARARs to the extent practicable, considering the exigencies of the situation. The preamble to the proposed NCP contains guidance on how to determine whether compliance is "practicable."

On-site removal and remedial actions must comply with substantive aspects of both applicable and relevant and appropriate requirements. Off-site removal and remedial actions must comply with both substantive and administrative aspects of applicable requirements only.

The RCRA land disposal restrictions are a potential ARAR for Superfund actions. As you may know, OERR is developing a guidance document to assist the Regions in complying with the LDRs. Although several issues must be resolved

before this guidance is issued, this memorandum will summarize one of the major issues that has been decided, namely, how to determine whether the LDRs are "applicable" to a Superfund response action. This policy will be discussed in greater detail in the guidance document.

Objective

In order to assist Regional removal and remedial staff in making current site decisions about the LDRs, this memorandum will explain: 1) how to determine when the LDRs are "applicable" to a Superfund removal or remedial action, and 2) the Superfund approach for complying with the LDRs when they are determined to be applicable. (This memorandum does not address how to make "relevant and appropriate" determinations.)

Implementation

Section A below explains how site managers (OSCs, RPMs) should determine whether the LDRs are "applicable" to a Superfund response action. Section B explains how Superfund intends to comply with the LDRs when they are determined to be applicable.

A. Application of the LDRs to CERCLA response actions

To determine if the LDRs are applicable to a given response action at a Superfund site, the site manager must answer three questions. The answer to each question must be "yes" for the LDRs to be applicable.

1. Does the CERCLA action constitute "placement"?

The LDRs are triggered as applicable requirements by "placement" of restricted RCRA hazardous wastes in land-based units.[1] Placement occurs when wastes are land disposed (or placed) in land-based RCRA units, such as landfills, surface impoundments, waste piles, and land treatment facilities. Placement does not occur if wastes are moved within a unit or are left in place (e.g., capping, in-situ treatment, consolidation within a unit). Placement does occur when wastes are moved from one unit and placed in another unit. For example, if wastes from a CERCLA site are disposed at an off-site landfill, this action constitutes placement.

However, the concept of a RCRA unit may be less useful for uncontrolled hazardous waste sites, which often involve widespread and dispersed contamination. Therefore, to assist in defining when placement occurs for on-site disposal at Superfund sites, the Agency has developed the concept of an

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[1] Several LDR requirements (the storage restrictions, dilution prohibition, and off-site notification requirements, in particular) are triggered when restricted wastes are generated, or picked up, rather than when the wastes are "placed." However, the major LDR restrictions discussed in the remainder of this memorandum are triggered only if wastes are "placed."

"area of contamination" (AOC). An AOC is delineated by the extent of continuous contamination, although one AOC may contain varying types and concentrations of contamination. For example, a waste pit with the surrounding contaminated soil is one AOC and may be viewed as a single "unit," e.g., a single landfill. For the purposes of the LDRs, therefore, AOCs are equivalent to RCRA units.

Movement of waste within the AOC does not constitute placement, but movement of waste out of the AOC into another unit will trigger placement. Placement would occur if wastes from different AOCs are consolidated into one AOC or if wastes are removed and treated outside the AOC and returned to the same or a different AOC. Placement would also occur if wastes are excavated from the AOC, placed in an incinerator or tank located within the AOC, and then redeposited into the AOC, because the incinerator and tank are considered separate units from the AOC.

2. Is the CERCLA waste also a RCRA hazardous waste?

The LDRs are applicable only to RCRA hazardous wastes (i.e., listed and characteristic wastes identified under §261). However, not all wastes at Superfund sites are RCRA hazardous wastes. Therefore, the site manager must decide if it is reasonably ascertainable, within the scope of the Superfund site investigation, that the CERCLA waste is also a RCRA hazardous waste. Reasonable efforts must be used to collect the information needed to determine if a waste is a RCRA listed or characteristic waste. (It is expected that current data collection efforts at Superfund sites should be sufficient for this purpose.) The site manager should have affirmative evidence (e.g., manifests, records, knowledge of process) to demonstrate that the Superfund waste is a RCRA hazardous waste for the LDRs to be potentially applicable.

To determine whether a CERCLA waste is a RCRA characteristic waste, site managers may test the waste or use their knowledge of the properties of the waste. To determine if a waste is a listed waste, sampling alone will not be sufficient. The RCRA listing descriptions will generally require that the site manager have knowledge about the source of the waste (for example, did the sludge on site result from a wastewater treatment operation?) or its prior use (e.g., was the waste unused when it was discarded?).

If the site manager determines that the site waste is a RCRA hazardous waste, he/she must also determine if that waste is a "California list" waste. The California list wastes are a distinct category of RCRA hazardous wastes regulated under the LDRs. The LDR regulations describe the California list wastes and they will be discussed in the forthcoming guidance document.

3. Is the RCRA waste restricted under the LDRs at the time of placement?

The land disposal restrictions are being phased in for the RCRA hazardous wastes over a period of time. Attachment 1 presents the LDR statutory deadlines established by section 3004 of the 1984 RCRA amendments. A RCRA waste becomes a restricted waste under the LDRs on its statutory deadline, or earlier if EPA chooses to promulgate treatment standards for a waste prior to this deadline. Note that after May 1990, all RCRA hazardous wastes (that were

listed or characteristic as of the 1984 RCRA amendments) will be restricted under the LDRs.

To determine if the LDRs are applicable, site managers should determine if the RCRA waste will be restricted under the LDRs at the time the waste is to be placed.

To summarize Section A, the LDRs are applicable when three conditions are met: 1) the CERCLA action constitutes placement, 2) the CERCLA waste is a RCRA hazardous waste, and 3) the RCRA waste is restricted at the time of placement. If these conditions are met, the CERCLA action must comply with the LDRs, unless an ARAR waiver is granted (remedial actions) or compliance with the LDRs is determined not to be "practicable" (removal actions).

B. Superfund compliance with the LDRs

Section B briefly describes the different types of LDR requirements and provides an overview of the Superfund approach for complying with these LDR requirements when they are determined to be "applicable." Section B describes only the major LDR restrictions; the upcoming guidance document will give a complete description of all LDR provisions.

1. Summary of the major LDR requirements

When a waste becomes "restricted" on its statutory deadline (or possibly earlier), one of four types of restrictions will take effect:

Treatment standard (§268.40-43) - The RCRA amendments direct EPA to promulgate treatment standards for all RCRA hazardous wastes by the statutory deadlines. To date, most of the standards set by EPA are concentration levels that must be achieved prior to land disposal. (The regulations specify whether a total waste analysis or the Toxicity Characteristic Leaching Procedure (TCLP) must be used to measure the concentration levels.) For concentration-based treatment standards, any technology may be used to achieve these standards. However, in limited cases, EPA has also promulgated a specific technology as a treatment standard, or has established a "no land disposal" treatment standard where a waste was no longer generated, no longer being land disposed, or was capable of being totally recycled.

National capacity extension (§268.30-33) - When EPA sets a treatment standard for a waste, it must also determine if there is sufficient capacity available nationwide to treat the waste to that standard. If not, EPA may grant a nationwide capacity extension for the waste for up to two years. During the extension, the waste does not have to meet the treatment standard. However, if waste that does not meet the standard is disposed in a landfill or surface impoundment, the receiving unit must meet the RCRA §3004(o) minimum technology requirements (e.g., double liner, leachate collection system, ground water monitoring). Because of these limitations on disposal, wastes are still considered "restricted" during national capacity extensions.

Attachment 2 highlights the national capacity extensions that EPA has granted to date for CERCLA soil and debris wastes that are contaminated with RCRA restricted wastes.

Soft hammer (§268.8) - If EPA fails to set a treatment standard for a First or Second Third waste on the statutory deadline, the soft hammer goes into effect automatically. The soft hammer places two requirements on the disposal of wastes in landfills and surface impoundments: 1) the receiving unit must meet the RCRA minimum technology requirements, and 2) the generator must demonstrate and certify that he has investigated treatment options for the waste, and, where treatment is practically available, that the waste has been treated using the best practically available treatment method. The soft hammer remains in effect until EPA sets a treatment standard for the waste, or until the hard hammer falls in May 1990, whichever comes first.

Hard hammer (RCRA §3004(g)(6)(C)) - If EPA fails to set a treatment standard for a solvent, dioxin, or California list waste by the statutory deadlines for these wastes, or for any "Third" waste by May 1990, the hard hammer falls. The hard hammer prohibits all land disposal of the affected waste.

Compliance with RCRA and the LDRs may also be obtained through several options other than meeting the restrictions above. It is important to note that **these options constitute compliance with RCRA; they do not require an ARAR waiver under CERCLA.**

A Treatability Variance (§268.44) is available when a treatment standard has been set for a waste. The variance can be used where, because the site manager's waste is significantly different from the waste used by EPA to set the treatment standard, the standard cannot be met or the BDAT technology is inappropriate. The variance can be granted either administratively, for a particular waste at a particular site, or through a rule-making procedure, which establishes a new nationwide waste category and associated treatment standard.

An Equivalent Treatment Method Petition (§268.42) can be used where a treatment standard is a specified technology, but the site manager can demonstrate that another technology can achieve an equivalent measure of performance.

A No-Migration Petition (§268.6) can be used as an alternative to any of the four restrictions above. The site manager must demonstrate that there will be no migration of hazardous constituents above health-based levels from the disposal unit or injection zone for as long as the waste remains hazardous.

Delisting (§260.20 and §260.22) can be used as an alternative to any of the four restrictions above, when the RCRA hazardous waste is a listed waste. The site manager must demonstrate that: 1) the waste does not meet any of the criteria under which the waste was listed, and 2) other factors

(including additional constituents) would not cause the waste to be hazardous.

2. Superfund approach for complying with the LDR requirements

The present Superfund approach for complying with the LDRs when they are applicable requirements is illustrated below:

CASE A: CERCLA **liquid or sludge** wastes that are also RCRA restricted hazardous wastes

CERCLA liquid or sludge	+	RCRA restricted hazardous waste	+	Placement	=	LDR is applicable. Must comply (unless CERCLA ARAR waiver is granted). If the LDR restriction is a treatment standard, evaluate whether it can be met. If not, determine if a Treatability Variance or other RCRA option is appropriate.

CASE B: CERCLA **soil or debris** wastes that contain RCRA restricted hazardous wastes

CERCLA soil or debris	+	RCRA restricted hazardous waste	+	Placement	=	LDR is applicable. Must comply (unless CERCLA ARAR waiver is granted). If LDR restriction is a treatment standard, will generally be appropriate to seek a Treatability Variance. Other RCRA options may also be appropriate.

CERCLA response actions often address waste matrices, such as contaminated soil and debris, that are different from the RCRA industrial wastes used to set the LDR treatment standards. Therefore, the Agency is undertaking a rulemaking that will set LDR treatment standards specifically for contaminated soil and debris. Until that rulemaking is completed, site managers should use the data collected during the removal and remedial site investigations to support a Treatability Variance for soil and debris where necessary. As part of this interim approach, the Agency is developing specific guidance for obtaining a Treatability Variance for soil and debris, which establishes alternate treatment levels or methods for soil and debris.

If you have further questions, you may call the Headquarters Superfund Regional Coordinators, Carolyn Offutt of the CERCLA program (FTS 475-9760), or Michaelle Wilson of the RCRA land disposal restrictions program (FTS 382-4770).

Attachments

cc: Regional Counsel, Regions I-X
Director, Waste Management Division, Regions I, IV, V, VII, and VIII
Director, Emergency and Remedial Response Division, Region II
Director, Hazardous Waste Management Division, Regions III and VI
Director, Toxics and Waste Management Division, Region IX
Director, Hazardous Waste Division, Region X
Environmental Services Division Directors, Regions I, VI, and VII
Henry Longest
Sylvia Lowrance
Bruce Diamond
Lisa Friedman
Superfund Branch Chiefs, Regions I-X
Oil and Hazardous Materials Coordinators, Regions I-X
Bettie Van Epps, OERR Document Coordinator

Attachment 1

LDR STATUTORY DEADLINES

RCRA HAZARDOUS WASTE	STATUTORY DEADLINE*
Spent solvent wastes (F001-F005)	November 8, 1986
Dioxin wastes (F020-F023 and F026-F028)	November 8, 1986
California list wastes - Any RCRA hazardous waste; and - Liquid (except for HOCs); and - Exceeds statutory prohibition level for certain cyanides, metals, corrosives, PCBs or HOCs	July 8, 1987
CERCLA/RCRA corrective action soil and debris (Solvent-containing, dioxin-containing, and California list wastes only)	November 8, 1988
First Third wastes (listed RCRA hazardous wastes)	August 8, 1988
Second Third wastes (listed RCRA hazardous wastes)	June 8, 1989
Third Third wastes (listed and characteristic RCRA hazardous wastes)	May 8, 1990
New RCRA wastes (any RCRA hazardous waste listed or identified under RCRA 3001 after November 8, 1984)	Within 6 months of listing or identification**

* These dates are statutory deadlines in HSWA. On this date, some type of LDR restriction will apply (i.e., treatment standard, minimum requirement during national capacity extension, soft hammer, hard hammer). However, the Agency also has the authority to restrict a waste earlier than its statutory deadline. Currently, the Agency is planning to restrict certain Third Third wastes in the June 1989 Second Third rule, so individual regulations must be checked.

** If EPA misses the 6 month deadline, the waste will not be restricted under the LDRs because HSWA contained no hammer provisions for newly identified wastes.

Attachment 2

LDR NATIONAL CAPACITY EXTENSIONS FOR CERCLA SOIL AND DEBRIS

Waste Category	Statutory Deadline	Treatment Standard Effective Date
Solvent (F001-F005)	November 8, 1988	November 8, 1990*
Dioxin (F020-F023 and F026-F028)	November 8, 1988	November 8, 1990*
California list (HOCs)	November 8, 1988	November 8, 1990*
First Third:		
Wastes where BDAT is incineration	August 8, 1988	August 8, 1990*
Wastes where BDAT is other than incineration	August 8, 1988	August 8, 1988**
Soft hammer wastes - treatment standard not set; must meet soft hammer restrictions as of 8/8/88	August 8, 1988	N/A

* The effective date is based on the granting of a national capacity extension. During the capacity extension, the soil and debris do not have to meet the promulgated treatment standards. However, if soil or debris that does not meet the standard is disposed in a landfill or surface impoundment, the receiving unit must meet the RCRA minimum technology requirements (double liner, leachate collection system, ground water monitoring).

** Except for K048-K052 and K071, which were granted capacity extensions until August 8, 1990.

Regional ARARs and LDR Contacts

19

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

March 1988

OFFICE OF
SOLID WASTE AND EMERGENCY RESPONSE

OSWER Dir. #9234.1-03

MEMORANDUM

SUBJECT: Regional ARARs and LDR Contacts

FROM: Henry L. Longest II, Director
Office of Emergency and Remedial Response

TO: Director, Waste Management Division
Regions I, IV, V, VII, VIII
Director, Emergency and Remedial Response Division
Region II
Director, Hazardous Waste Management Division
Regions III, VI
Director, Toxic and Waste Management Division
Region IX
Director, Hazardous Waste Division, Region X

Purpose:

The purpose of this memo is to draw your attention to valuable resources in the Regions on applicable or relevant and appropriate requirements (ARARs) policy and on RCRA Land Disposal Restrictions (LDR).

Background:

As you may know, each Region has designated an ARARs contact person(s) who is responsible for funneling ARARs-related information of various kinds to Regional staff (see attached list). My staff works with these Regional representatives to transmit information and policy developments on ARARs and to identify problems and questions on ARARs the Regions are facing. The Regional ARARs contacts are developing expertise on ARARs and should be a useful resource for Regional staff.

The Regional ARARs contacts, for example, were participants in the pilot CERCLA Compliance With Other Laws Workshop and are supporting ARARs training sessions in their Region. The ARARs contacts have been participating in the monthly ARARs conference calls instituted by the Policy and Analysis Staff (PAS) in October, through which they are receiving and contributing up-to-date information on ARARs-related issues and activities. We are pleased that some Regional ARARs contacts have also taken an active role in ARARs policy development in conjunction with Headquarters staff. We appreciate their involvement because it provides us with a valuable perspective.

The development of a Headquarters-Regional "network" on ARARs is one of several initiatives undertaken in the past year to provide information on implementing the provision in Section 121(d) of SARA that our remedies comply with ARARs. We have also developed and made available Part I of the CERCLA Compliance with Other Laws Manual, which discusses general policy, and RCRA and water ARARs, and are conducting training in each Region on the information and policies discussed in the Manual. These efforts are being made to ensure that Regional personnel understand ARARs and -- most importantly -- follow consistent policies in implementing the statutory requirement to comply with other laws.

Finally, specific Regional staff are also developing expertise in perhaps the most significant -- and most complicated -- ARAR for Superfund, the RCRA Land Disposal Restrictions (LDR), through participation on the workgroup for guidance on CERCLA compliance with LDR. Like the ARARs contacts, these Regional people are valuable resources for information and current policies, and will serve as conduits between Headquarters and Regional offices on RCRA LDR developments.

Objective:

This memo is to make you aware of the role that the ARARs and LDR contacts are playing in your Region.

Implementation:

Please support our effort to strengthen the on-going communication links and inform the appropriate Regional staff of these resources.

Attachments

cc: Regional Superfund Branch Chiefs
Regional Superfund Section Chiefs
Betti VanEpps, Docket Coordinator

LIST OF REGIONAL ARARs CONTACTS

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FTS-257-2643

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Guidance on Superfund Compliance with LDRs
Headquarters Workgroup Members

Regional Contacts for Superfund Compliance with LDR

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* = lead contact for remedial prgm.
** = lead contact for removal prgm.

Land Disposal Restrictions as Relevant and Appropriate Requirements for CERCLA Contaminated Soil and Debris

20

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

OFFICE OF
SOLID WASTE AND EMERGENCY RESPONSE

JUN - 5 1989

OSWER Directive No. 9347.2-01

MEMORANDUM

SUBJECT: Land Disposal Restrictions as Relevant and Appropriate Requirements for CERCLA contaminated Soil and Debris

FROM: Henry L. Longest II, Director
Office of Emergency and Remedial Response

Bruce M. Diamond, Director
Office of Waste Programs Enforcement

TO: Directors, Waste Management Division
Regions I, IV, V, VII, VIII
Director, Emergency and Remedial Response Division
Region II
Directors, Hazardous Waste Management Division
Regions III, VI
Director, Toxic and Waste Management Division
Region IX
Director, Hazardous Waste Division
Region X

PURPOSE

To transmit OSWER policy on the relevance and appropriateness of the Land Disposal Restrictions (LDRs) to CERCLA responses involving contaminated soil and debris.

BACKGROUND

As clarified in OSWER Directive 9347.1-02 (see attachment), the LDRs are applicable to CERCLA responses only when such actions constitute placement of a restricted RCRA waste. Therefore, if no restricted RCRA wastes are identified in a Superfund waste that is being placed, the LDRs would not be applicable. Site-specific questions have arisen, however, as to the relevance and

appropriateness of the LDRs to soil and debris that do not contain RCRA restricted wastes. In particular, Region II (having determined that the contaminated soil and debris to be treated and "placed" at the 93rd Street site did not contain RCRA hazardous wastes) sought consultation with Headquarters on whether LDRs should be considered relevant and appropriate given that the Agency is in the process of developing treatment standards for soil and debris wastes separate from the treatment standards developed for industrial process wastes.

OSWER POLICY

OSWER has concluded that until a rulemaking is completed that establishes treatment standards for soil and debris, the LDRs generally should not be considered as relevant and appropriate for soil or debris that does not contain restricted RCRA wastes. The following language should be incorporated into feasibility study ARAR discussions, proposed plans, and the "Compliance with ARARs" section of future RODs for situations similar to the above example:

> The Agency is undertaking a rulemaking that will specifically apply to soil and debris. Since that rulemaking is not yet complete, EPA does not consider LDR to be relevant and appropriate at this site to soil and debris that does not contain RCRA restricted wastes.

Should you have any questions regarding this policy, please contact your Regional Coordinators in the Hazardous Site Control Division, the CERCLA Enforcement Division, or Steve Golian (FTS 475-9750) in the Site Policy and Guidance Branch.

Attachment

cc: Sylvia Lowrance, OSW

Applicability of Land Disposal Restrictions to RCRA and CERCLA Ground Water Treatment Reinjection Superfund Management Review : Recommendation No. 26

21

154

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

OFFICE OF
SOLID WASTE AND EMERGENCY RESPONSE

DEC 27 1989 OSWER Directive # 9234.1-06

MEMORANDUM

SUBJECT: Applicability of Land Disposal Restrictions to RCRA and CERCLA Ground Water Treatment Reinjection Superfund Management Review: Recommendation No. 26

FROM: Don R. Clay, Assistant Administrator
Office of Solid Waste and Emergency Response

TO: Waste Management Division Directors
Regions I - X

Regional Counsel
Regions I - X

Purpose

There has been some question as to whether ground water contaminated with restricted RCRA hazardous wastes, which is extracted during a RCRA corrective action or CERCLA response action, must meet the best demonstrated available technology (BDAT) identified for that waste under the RCRA land disposal restrictions (LDRs) prior to each reinjection, in a pump-and-treat reinjection remediation system. (See RCRA sections 3004 (f), (g) and (m), and 40 C.F.R. Parts 148 and 268.) This memorandum explains EPA's interpretation of whether the LDRs are applicable or (under CERCLA response actions only) relevant and appropriate to such reinjections or to the remediation as a whole.

Background

RCRA LDRs prohibit land disposal of restricted RCRA hazardous wastes that do not meet treatment standards after the effective date of the restrictions. Treatment standards for RCRA hazardous wastes are based upon the best demonstrated available technology (BDAT) identified for that waste. See 40 C.F.R. 268. Because placement of hazardous waste into underground injection wells constitutes "land disposal" under LDR (see RCRA section 3004(k)), and the ground water undergoing reinjection may contain a restricted waste, the issue has been raised as to whether each reinjection of contaminated ground water should meet BDAT during response or corrective actions.

RATIONALE

Ground water restoration under RCRA corrective actions and CERCLA response actions often involves withdrawal, treatment of the contaminated water, and reinjection of the treated water into the ground. The land disposal restrictions (LDR) of the Resource Conservation and Recovery Act (RCRA) prohibit land disposal of restricted RCRA hazardous wastes that do not meet treatment standards after the effective date of the restrictions. Treatment standards for RCRA hazardous wastes are based upon the best demonstrated available technology (BDAT) identified for that waste. See 40 C.F.R. 268. Because placement of hazardous waste into underground injection wells constitutes "land disposal" under LDR (see RCRA section 3004(k)), and the ground water undergoing reinjection may contain a restricted waste, the issue has been raised as to whether each reinjection of contaminated ground water should meet BDAT during response or corrective actions.[1]

Section 3020 of RCRA [previously section 7010[2]] specifically addresses waste injection in the context of CERCLA and RCRA cleanups. RCRA section 3020(a) bans hazardous waste disposal by underground injection into or above an underground source of drinking water (within one-quarter mile of the well). However, RCRA section 3020(b) exempts from the ban all reinjections of treated contaminated ground water into such formations undertaken as part of a CERCLA section 104 or 106 response action, or a RCRA corrective action. To qualify for the exemption, the following three conditions must be met: (1) the injection is a CERCLA response action or a RCRA corrective action, (2) the contaminated ground water must be treated to substantially reduce hazardous constituents prior to such injection, and (3) the response action or corrective action must be sufficient to protect human health and the environment upon completion.

Although RCRA section 3020 and the LDR provisions at RCRA sections 3004(f), (g) and (m) arguably can address the same activity, RCRA section 3020 specifically applies to all CERCLA and

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[1] CERCLA remedial actions are required to meet Federal requirements and standards at completion of the remedial action if the Federal standards are applicable or relevant and appropriate requirements (ARARs), absent invocation of a statutory waiver. See CERCLA section 121(d). Agency policy and the proposed National Contingency Plan (NCP) require the Agency to comply with all ARARs pertinent to the action during the course of a remedial action, as well as upon its completion. See the proposed NCP (published at 53 Fed. Reg. 51,394 (Dec. 21, 1988)(to be codified at 40 C.F.R. 300.435(b)(2)), and CERCLA Compliance with Other Laws Manual: Part I, I-8 (OSWER Directive number 9234.1-01, August 8, 1988).

[2] RCRA section 3020 was section 7010 in the Hazardous and Solid Waste Amendments of 1984, but was re-numbered in 1986.

RCRA ground water treatment reinjections into Class IV injection wells.[3] Consistent with traditional principles of statutory construction, RCRA section 3020 -- which is directly focused on injections of treated contaminated ground water into Class IV wells during cleanups -- should be controlling for such injections; a contrary reading would render section 3020(b) meaningless. Where Congress has provided two potentially applicable statutory provisions, a choice between them is both necessary and appropriate, and within the discretion of the expert agency. Accordingly, EPA construes the provisions of RCRA section 3020 to be applicable instead of LDR provisions at RCRA sections 3004(f), (g), and (m), to reinjections of contaminated ground water into an underground source of drinking water (USDW), which are part of a CERCLA response action or RCRA corrective action.

As a result, the three conditions of RCRA section 3020(b) must be met during response or corrective actions involving ground water treatment reinjection into or above underground sources of drinking water. Failure to meet these conditions bans the activity under RCRA section 3020(a).[4] First, the injections must be part of a CERCLA response action or a RCRA corrective action. Second, each reinjection has to be treated to "substantially reduce hazardous constituents prior to such injection..." (RCRA section 3020(b)). Until guidance is prepared addressing the issue, steps necessary to "substantially reduce" hazardous constituents during a RCRA corrective action or a CERCLA response action should be decided on a case-by-case basis. Third, the response or corrective action upon completion must "be sufficient to protect human health and the environment" (RCRA section 3020(b)). RCRA and CERCLA statutes, regulations and policies should be reviewed to determine protectiveness.

The issue may also arise under CERCLA as to whether LDRs are relevant and appropriate requirements when treated ground water is reinjected into Class IV wells as part of a CERCLA response action. In order to be considered to be both "relevant" and "appropriate," a requirement must address problems or situations similar to the circumstances of the release or remedial action contemplated, and be well-suited to the site. A key factor in determining the potential relevance and appropriateness of a

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[3] Class IV injection wells are used to inject contaminated ground water into or above an underground source of drinking water. See 40 C.F.R. 146.5(d). In most situations, ground water treatment reinjection involves only Class IV injection wells because treated ground water is recharged back into an underground source of drinking water (USDW) during pump-and-treat activities, not beneath it. Other classes of wells are not subject to section 3020's special provisions.

[4] Note, however, that an ARARs waiver may be appropriate in certain cases for actions taken under CERCLA.

requirement is to compare the CERCLA response objective with the purpose and objective of the requirement. See "CERCLA Compliance with Other Laws Manual" at p. 1-65 (EPA, August 8, 1988); proposed NCP, 53 FR at 51436 (Dec. 21, 1988) (proposed section 300.400(g)(2)).

The ultimate purpose of treating and reinjecting ground water into Class IV wells is to restore the formation to drinking water quality. EPA believes that standards that have been specifically developed to establish drinking water quality levels (such as MCLs[5]) are particularly well-suited to the accomplishment of that purpose. Although LDRs also prescribe treatment levels, those levels were not specifically developed to achieve drinking water quality (although they may often have that result). Thus, where drinking water standards are available, the Agency believes that they will generally be the relevant and appropriate requirement to use in setting treatment standards for CERCLA cleanups of drinking water formations.

In situations where no drinking water standard has been promulgated for the contaminants to be treated, the Region should consider potentially relevant and appropriate requirements (including any available health-based standards, LDR treatment standards, etc.) and attain the standard, if any, that the Agency finds is "relevant and appropriate under the circumstances of the release" (or justify a waiver).[6] EPA guidance sets out a number of factors for deciding if a requirement is relevant and appropriate under the circumstances of the release. See CERCLA Compliance with Other Laws Manual, at p. 1-67.

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NOTICE: The policies set out in this memorandum are intended solely for the guidance of Government personnel. They are not intended, nor can they be relied upon, to create any rights enforceable by any party in litigation with the United States. EPA officials may decide to follow the guidance provided in this memorandum, or to act at variance with the guidance, based on an analysis of specific site circumstances. The Agency also reserves the right to change this guidance at any time without public notice.
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[5] See the discussion of MCLs and MCLGs in the proposed and final NCP.

[6] If no such standards are relevant and appropriate, TBCs may be used as cleanup levels; use of a TBC should be explained and justified for each specific case.

Separate from the restrictions found in RCRA LDRs, an independent provision of the statute, RCRA Section 3020, bans hazardous waste injection into drinking water formations (Class IV injection wells), unless the conditions in subpart (b) are met. Subpart (b) permits reinjection of contaminated ground water that has been treated if: (1) the injection is a CERCLA response action or a RCRA corrective action, (2) the contaminated ground water is treated to substantially reduce hazardous constituents prior to each injection, and (3) the response action or corrective action is sufficient to protect human health and the environment upon completion. (See RCRA section 3020(b).)

Resolution

For the reasons specified in the attachment to this memorandum, LDR is not applicable to these activities. Instead of LDR, RCRA section 3020 applies to reinjection of treated contaminated ground water into Class IV injection wells during CERCLA response actions or RCRA corrective actions. Moreover, for CERCLA response actions where the goal is to clean up ground water to drinking water levels, the Agency believes that health-based drinking water standards (e.g. MCLs) -- rather than LDRs -- will generally be the relevant and appropriate cleanup standard. See the attachment.

Until guidance addresses the issue, what is required to "substantially reduce" hazardous constituents prior to each injection in a CERCLA response action or RCRA corrective action should be determined on a case-by-case basis. RCRA and CERCLA program policies and guidance should be reviewed to determine protectiveness upon completion of the action.

Attachment

cc: CERCLA and RCRA Branch Chiefs
Office of Drinking Water

Superfund LDR Guide #1
Overview of RCRA Land Disposal Restrictions

22

United States Environmental Protection Agency

Office of Solid Waste and Emergency Response

Superfund Publication: 9347.3-01FS
July 1989

EPA

Superfund LDR Guide #1

Overview of RCRA Land Disposal Restrictions (LDRs)

The Hazardous and Solid Waste Amendments (HSWA) to the Resource Conservation and Recovery Act (RCRA) - - P.L. 98-616, signed on November 8, 1984 - - include specific provisions restricting the land disposal of RCRA hazardous wastes. The purpose of these HSWA provisions is to minimize the potential of future risk to human health and the environment by requiring the treatment of hazardous wastes prior to their land disposal. **This guide summarizes the major components of the land disposal restrictions (LDRs), outlines the types of restrictions imposed, and presents the compliance options specified in the regulation.** Other Superfund LDR Guides are listed at the end of this guide. More detailed guidance on Superfund compliance with the LDRs is being prepared by the Office of Solid Waste and Emergency Response (OSWER).

DEFINITION OF LAND DISPOSAL

The LDRs place restrictions on the land disposal of RCRA hazardous wastes. The definition of land disposal (or "placement," which is synonymous with "land disposal") under RCRA includes, but is not limited to:

> *any "placement" of hazardous waste in a landfill, surface impoundment, waste pile, injection well, land treatment facility, salt dome formation, salt bed formation, underground mine or cave, and concrete bunker or vault.* (RCRA §3004(k))

The LDRs apply only to RCRA hazardous wastes that are land disposed or placed. They do not apply to wastes that are discharged to surface waters (where National Pollutant Discharge Elimination System (NPDES) requirements apply) or to Publicly Owned Treatment Works (where pretreatment requirements apply). The LDRs also do not apply to contaminated ground water treated and supplied directly to households (where Maximum Contaminant Levels (MCLs) generally apply).

It is important to note that the LDRs apply prospectively to wastes that are land disposed after the effective date of the restrictions (i.e., the LDRs do not require that wastes land disposed prior to the date of the restrictions be removed and treated).

STATUTORY DEADLINES

HSWA directed EPA to establish treatment standards for each of seven groups of RCRA hazardous wastes by specific dates. These dates, referred to as statutory deadlines, will eventually restrict land disposal of all RCRA hazardous wastes, as shown in **Highlight 1.**

Highlight 1: LDR STATUTORY DEADLINES

Waste	Statutory Deadline
Spent Solvent and Dioxin-Containing Wastes	November 8, 1986
California List Wastes	July 8, 1987
First Third Wastes	August 8, 1988
Spent Solvent, Dioxin-Containing, and California List Soil and Debris From CERCLA/RCRA Corrective Actions	November 8, 1988
Second Third Wastes	June 8, 1989
Third Third Wastes	May 8, 1990
Newly Identified Wastes	Within 6 months of identification as a hazardous waste

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The statutory deadlines are important because they are the dates on which RCRA wastes become "restricted," although EPA has the authority to restrict a waste before its statutory deadline. For example, the Agency has restricted certain Second Third wastes in the First Third rule and certain Third Third wastes in the June 1989 Second Third rule.

STATUTORY WASTE CATEGORIES

The first category of wastes (refer to **Highlight 1**) includes: the F001-F005 spent solvent-containing RCRA wastes and the F020-F023 and F026-F028 dioxin-containing RCRA wastes. The second category, the California list wastes, is a distinct category of RCRA hazardous wastes described further in Superfund LDR Guide #2. The three categories of scheduled wastes (i.e., First Third, Second Third, Third Third wastes) include all listed and characteristic hazardous wastes identified as of November 8, 1984 (excluding the solvent and dioxin wastes mentioned above). EPA ranked the scheduled wastes based on their toxicity and volume and placed the highest toxicity/volume wastes in the "First Third." Soil and debris (see **Highlight 2**) contaminated with spent solvent- or dioxin-containing and California list wastes generated during CERCLA response and RCRA corrective actions were given a separate statutory deadline. Finally, wastes newly identified or listed after 1984 must have standards set within six months of their identification or listing as a hazardous waste.

Highlight 2: DEFINITIONS OF SOIL AND DEBRIS

Soil is defined as materials that are primarily of geologic origin such as sand, silt, loam, or clay that are indigenous to the natural geological environment at or near the CERCLA site. (In many cases, soil is mixed with liquids, sludges, and/or debris.)

Debris is defined as materials that are primarily non-geologic in origin such as grass, trees, stumps, and man-made materials such as concrete, clothing, partially buried whole or empty drums, capacitors, and other synthetic manufacturing items, such as liners. (It does not include synthetic organic chemicals, but may include materials contaminated with these chemicals.)

TYPES OF LDR RESTRICTIONS

As discussed above, a RCRA hazardous waste becomes "restricted" under the LDRs on its statutory deadline (or earlier if EPA promulgates the restriction ahead of schedule). On that date, one of four types of restrictions will apply:

1. Treatment standards: EPA may set one of three types of treatment standards for restricted wastes:

   - A concentration level to be achieved prior to disposal (the most common type of treatment standard);
   - A specified technology to be used prior to disposal; or
   - A "no land disposal" designation when the waste is no longer generated, is totally recycled, is not currently being land disposed, or no residuals are produced from treatment.

   All three types of treatment standards are established based on the best demonstrated available technology (BDAT) identified for that waste.

2. Minimum technology requirements during a national capacity extension: When EPA sets a treatment standard, it may grant a national capacity extension (for up to two years) if sufficient treatment capacity is not available for that waste. During a national capacity extension, the treatment standards set for a waste do not have to be met. However, if wastes that do not meet the standards are disposed of in a landfill or surface impoundment, the receiving unit must meet the RCRA minimum technology requirements (i.e., double liner, leachate collection system, and ground-water monitoring).

   When EPA sets treatment standards for Third Third wastes in May 1990, it may grant a national capacity extension, but only for up to two years. Therefore, by May 1992, all national capacity extensions will have expired. The only exception may be if EPA grants an extension when it sets treatment standards for newly identified wastes. Superfund LDR Guide #3 provides additional information on the minimum technology requirements.

3. Soft hammer restrictions: If EPA fails to set a treatment standard for a First or Second Third

waste by its statutory deadline, soft hammer restrictions apply. The soft hammer requirements place the following restrictions on the disposal of wastes in landfills and surface impoundments:

- The receiving unit must meet minimum technology requirements; and

- Site managers (OSCs, RPMs as generators) must determine if treatment is practically available. If treatment is practically available, the site manager must use the best practically available treatment to treat wastes before disposal; if treatment is not practically available, the wastes may be disposed of without treatment.

Land disposal in other types of units, such as land treatment units and waste piles, is not restricted under soft hammers, although an LDR notification will be required for actions involving off-site disposal in such units.

Soft hammer restrictions remain in effect until EPA sets a treatment standard, or until May 1990, when the hard hammer restrictions become effective.

4. Hard hammer restrictions: If EPA fails to set a treatment standard by the statutory deadlines for solvent- and dioxin-containing and California list wastes, or by May 8, 1990, for any of the scheduled wastes, the hard hammer restrictions prohibit all land disposal of the affected waste until a treatment standard is promulgated. To date, the hard hammer has only fallen for certain California list wastes.

   Superfund LDR Guide #4 provides more information on soft and hard hammer restrictions.

LDR COMPLIANCE OPTIONS

EPA recognizes that not all wastes can be treated to the LDR treatment standards and that alternative treatment standards and methods of land disposal may provide significant reduction in the toxicity, mobility, or volume of wastes and be protective of human health and the environment. The LDRs, therefore, provide the following compliance options to meeting the restrictions discussed above.

- Treatability Variance: This option is available when EPA has set a treatment standard as a concentration level, but because a generator's waste differs significantly from the waste used to set the standard, the promulgated treatment standard cannot be met or the BDAT technology is inappropriate for that waste. (For the purposes of the LDRs, CERCLA site managers are considered generators of hazardous waste.) Under a Treatability Variance, EPA approves an alternate treatment standard that must be met before that waste can be land disposed. Superfund LDR Guides #6A and #6B provide more information for obtaining Treatability Variances for remedial and removal actions.

- Equivalent Treatment Method Petition: This option is available when EPA has set a treatment standard that is a specified technology (e.g., incineration). Generators may use a different technology (e.g., chemical treatment) if they can demonstrate that this technology will achieve a measure of performance equivalent to that of the specified technology.

- No Migration Petition: This option may be used to meet any of the four types of LDR restrictions. Under this option, generators may land dispose wastes that do not meet the LDR restrictions if they can demonstrate that there will be "no migration" of hazardous constituents above health-based levels from the disposal unit or injection zone for as long as the wastes remain hazardous.

- Delisting. This option may be used to demonstrate that a waste is nonhazardous and, therefore, not subject to any of the RCRA Subtitle C hazardous waste regulations, including the LDRs. Delisting only applies when the CERCLA waste is a listed RCRA hazardous waste. (Characteristic wastes need not be delisted, but they can be treated to no longer exhibit the characteristic.) Generators must demonstrate that: (1) the waste does not meet any of the criteria for which the waste was listed as a hazardous waste, and (2) other factors (including additional constituents) do not cause the waste to be hazardous.

The LDRs also permit a case-by-case extension of up to two years, which allows a site-specific extension of the effective date if a generator has a binding contractual commitment for treatment capacity and can show that no capacity currently exists anywhere in the United States. This option, however, is generally not appropriate for Superfund response actions.

SOIL AND DEBRIS WASTES

As discussed earlier, the LDRs apply to soil and debris when they are contaminated with a restricted RCRA hazardous waste. Because of the complex

nature of many soil and debris matrices (as compared with the industrial process wastes upon which the LDR treatment standards were based), it may be difficult to meet these standards for wastes mixed with soil and debris. Consequently, the Agency is undertaking a rulemaking that will set LDR treatment standards specifically for soil and debris. Until that rulemaking is completed, however, site managers may need to obtain a Treatability Variance for actions addressing contaminated soil and debris.

OTHER LDR REQUIREMENTS

In addition to the four types of restrictions described above, the LDRs also include the following requirements:

- Storage Prohibition: The LDRs prohibit the storage of restricted wastes (including soft hammer wastes) unless storage is solely for the purpose of accumulating sufficient quantities of wastes to facilitate proper treatment, recovery, or disposal. For periods of up to one year, the burden is generally on EPA to prove that storage is not needed to facilitate proper treatment, recovery, or disposal; after one year, the burden of proof shifts to the storage facility. Temporary storage used during CERCLA actions to facilitate proper disposal (e.g., storage while awaiting sampling results, or while selecting and designing a remedy) is allowable under the storage prohibition.

- Exemption for Treatment in Surface Impoundments: Placing untreated wastes in surface impoundments (that meet the minimum technology requirements) for treatment is permissible, provided the treatment residues that do not meet the LDR treatment standards or prohibition levels are removed for subsequent management (through any treatment other than treatment in another surface impoundment) within one year of placement into the surface impoundment.

- Dilution Prohibition: Dilution of a waste as a means to comply with the LDRs is prohibited. However, "dilution" that is part of treatment (e.g., mixing for immobilization) is permissible.

The LDRs also establish requirements for testing, notification, and certification of compliance.

- Testing: Once it is determined that a waste is restricted under the LDRs, generators, treatment facilities, or disposal facilities must test the waste at a frequency specified in the facility's waste analysis plan to demonstrate compliance with LDR treatment standards or California list prohibition levels prior to land disposal.

- Notification: All restricted wastes that are shipped to an off-site treatment, storage, or disposal facility must be accompanied by a notification that includes the EPA hazardous waste number and the applicable LDR restriction that is in effect for those wastes.

- Certification: A treatment facility must certify that the LDR treatment standards are attained before a restricted waste is land disposed off-site. (There are also certification requirements specifically for soft hammer wastes; see Superfund LDR Guide #4.)

OTHER AVAILABLE SUPERFUND/LDR GUIDES

#2 Complying with the California List Restrictions Under LDRs

#3 Treatment Standards and Minimum Technology Requirements Under LDRs

#4 Complying With the Hammer Restrictions Under LDRs

#5 Determining When LDRs are Applicable to CERCLA Response Actions

#6A Obtaining a Soil and Debris Treatability Variance for Remedial Actions

#6B Obtaining a Soil and Debris Treatability Variance for Removal Actions*

#7 Determining When LDRs Are Relevant and Appropriate to CERCLA Response Actions*

*Currently being prepared in OSWER

Superfund LDR Guide #2
Complying with California List Restrictions Under Land Disposal Restrictions

23

United States Environmental Protection Agency
Office of Solid Waste and Emergency Response
Superfund Publication: 9347.3-02FS
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EPA

Superfund LDR Guide #2

Complying With the California List Restrictions Under Land Disposal Restrictions (LDRs)

The Hazardous and Solid Waste Amendments (HSWA) to the Resource Conservation and Recovery Act (RCRA) include specific restrictions on the land disposal of RCRA hazardous wastes. California list wastes are a distinct category of RCRA hazardous wastes that are restricted under the land disposal restrictions (LDRs). **This guide defines the California list wastes, summarizes their respective restrictions, and discusses their potential overlap with other LDR treatment standards.** More detailed guidance on California list waste restrictions and Superfund compliance with the LDRs is being prepared by the Office of Solid Waste and Emergency Response (OSWER).

DEFINITION OF CALIFORNIA LIST WASTES

To be classified as a California list waste, three conditions must be met:

(1) The waste must be a RCRA listed or characteristic waste;

(2) The waste must be a liquid (i.e., it fails method 9095 Paint Filter Liquids Test [PFLT]), except for Halogenated Organic Compounds (HOCs), which may be liquid or non-liquid; and

(3) The waste must exceed statutory prohibition levels for specified constituents.

The types of wastes that may be California list wastes are: free cyanides, certain metals, corrosive wastes, PCBs, and HOCs. (HOCs are compounds containing carbon and a halogen, such as fluorine, chlorine, bromine, iodine, and astatine, in their molecular formula). The Agency has limited the restricted HOCs to approximately 100 HOCs listed in Appendix III to 40 CFR Part 268. These restricted HOCs include solvents, pesticides, PCBs, and dioxins.

These hazardous wastes are referred to as California list wastes because the State of California developed regulations to restrict the land disposal of wastes containing these constituents, and Congress subsequently incorporated these provisions into the 1984 HSWA amendments to RCRA. Even if LDR treatment standards have not been promulgated for certain RCRA wastes (e.g., Third Third wastes), these wastes may be subject to California list restrictions.

If the Agency has promulgated a treatment standard for a California list hazardous waste, the waste must attain that treatment standard before land disposal. If the Agency has not set a treatment standard, the waste must be treated to below the prohibition level (or rendered non-liquid if a non-HOC waste) before it may be land disposed.

CALIFORNIA LIST LDR RESTRICTIONS

The Agency has promulgated treatment standards for PCB-containing wastes and HOC-containing wastes (except for dilute HOC wastewaters). The treatment standards for PCBs and some HOCs became effective on July 8, 1987.

The Agency has not set treatment standards for the remaining California list wastes. Instead, the Agency codified the statutory prohibition levels for corrosive wastes and dilute HOC wastewaters and allowed the hard hammer provisions to take effect for free cyanides and California list metals. The prohibitions on these wastes became effective on July 8, 1987. The effects of these restrictions are the same: prohibiting the land disposal of these wastes above the prohibition levels.

Based on a finding of inadequate treatment capacity, EPA granted a nationwide extension to the effective date for treating California list HOC wastes until July 8, 1989. The Agency subsequently rescinded the variance, and the restriction for HOC wastes became effective November 8, 1988. The Agency also granted

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an extension of the effective date for HOC-containing soil and debris wastes until July 8, 1989, for soil and debris wastes not from CERCLA/RCRA corrective actions, and until November 8, 1990, for soil and debris wastes from CERCLA/RCRA corrective actions. California list wastes granted a national capacity variance from the treatment standards may be disposed of in a landfill or surface impoundment only if the receiving unit complies with minimum technology requirements (See Superfund LDR Guide #3). The prohibition levels, treatment standards, and effective dates for the California list wastes are presented in **Highlight 1**.

OVERLAP WITH OTHER TREATMENT STANDARDS

As noted earlier, wastes must be RCRA listed or characteristic wastes to be California list wastes. Therefore, California list wastes may also be restricted as solvent- or dioxin-containing wastes or as scheduled wastes. For wastes covered by more than one LDR standard, the LDR restrictions for the more specific waste stream generally take precedence, once the standard is promulgated. For example, F006 non-wastewaters may be restricted under the California list rule because the waste is a liquid and may contain nickel above the statutory prohibition level. The F006 treatment standard, which is expressed as a concentration level, however, takes precedence over the California list restriction (i.e., codified prohibition level).

The Agency has determined that soft hammer wastes and wastes for which national capacity variances have been granted **remain subject to California list prohibitions** (i.e., if either of these waste types is subject to a California list treatment standard or statutory prohibition level, that treatment standard or statutory level must be met before the waste can be land disposed). If a California list treatment standard is promulgated for a soft hammer waste, the more stringent of the restrictions apply. For example, if a non-liquid soft hammer waste contains 1,100 mg/kg total HOCs, the waste must meet the California list treatment standard of incineration or burning in a boiler or industrial furnace before land disposal. If a liquid soft hammer waste contains 510 mg/l lead (for which no California list treatment standard exists), the soft hammer restrictions apply. If treatment is not available, the waste must at least be treated below the prohibition level (i.e., 500 mg/l) or rendered non-liquid and can only be disposed of in a surface impoundment or landfill if the receiving unit meets minimum technology requirements or has an equivalent waiver.

Highlight 1 - PROHIBITION LEVELS AND TREATMENT STANDARDS FOR CALIFORNIA LIST WASTES

California List Constituent	Prohibition Level	Treatment Standard	Effective Date
Free Cyanides	1000 mg/l	NONE -- hard hammer	July 8, 1987
Metals			
Arsenic	500 mg/l	NONE -- hard hammer	July 8, 1987
Cadmium	100 mg/l		
Chromium VI	500 mg/l		
Lead	500 mg/l		
Mercury	20 mg/l		
Nickel	134 mg/l		
Selenium	100 mg/l		
Thallium	130 mg/l		
Corrosives	pH < 2.0	NONE -- Codified prohibition levels	July 8, 1987
PCBs			
≥ 500 ppm	50 ppm	INCINERATION as specified under TSCA, 99.9999% DRE	July 8, 1987
≥ 50 ppm and < 500 ppm	50 ppm	INCINERATION OR THERMAL DESTRUCTION in Boiler, 99.9999% DRE	July 8, 1987
Halogenated Organic Compounds (HOCs)			
Dilute Wastewaters (<10,000 mg/kg)	1000 mg/kg	NONE -- Codified prohibition levels	July 8, 1987
Non-Dilute Wastewaters and Non-Liquids	1000 mg/kg	INCINERATION 99.99% DRE	Nov. 8, 1988
Non-RCRA/CERCLA Soil and Debris	1000 mg/kg	INCINERATION 99.99% DRE	July 8, 1989
RCRA/CERCLA Soil and Debris	1000 mg/kg	INCINERATION 99.99% DRE	Nov. 8, 1990

Superfund LDR Guide #3
Treatment Standards and Minimum Technology Requirements Under Land Disposal Restrictions

24

United States Environmental Protection Agency

Office of Solid Waste and Emergency Response

Superfund Publication: 9347.3-03FS
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EPA

Superfund LDR Guide #3

Treatment Standards and Minimum Technology Requirements Under Land Disposal Restrictions (LDRs)

CERCLA section 121(d)(2) requires that Superfund response actions comply with other environmental laws that are applicable or relevant and appropriate requirements (ARARs). A potential ARAR for CERCLA responses is the Resource Conservation and Recovery Act (RCRA) land disposal restrictions (LDRs) established under the Hazardous and Solid Waste Amendments (HSWA). The LDRs prohibit the land disposal of restricted RCRA hazardous wastes unless these wastes meet treatment standards specified in 40 CFR Part 268, meet the minimum technology requirements during a national treatment capacity extension, or satisfy the requirements of one of the other available compliance options (i.e., Treatability Variance, Equivalent Treatment Method Petition, No Migration Petition, or Delisting). **This guide summarizes the types and effective dates of treatment standards and outlines how to comply with the treatment standards and the minimum technology requirements set during national capacity extensions.** More detailed guidance on Superfund compliance with the LDRs is being prepared by the Office of Solid Waste and Emergency Response (OSWER).

TYPES OF TREATMENT STANDARDS

EPA has established treatment standards under the LDRs on the basis of the best demonstrated available technology (BDAT) rather than risk-based or health-based standards. "Best" is defined as that technology which offers the greatest reduction (based on a statistical analysis) of toxicity, mobility, or volume of the waste. To be "demonstrated," a treatment technology must be demonstrated to work at a full-scale level (i.e., technologies available only on a pilot- or bench-scale are not considered demonstrated). To be "available," a treatment technology must be commercially available.

Within this framework, the Agency has established three types of LDR treatment standards:

- Concentration levels -- which must be attained before the wastes or treatment residuals may be land disposed;
- Specified technologies -- which must be applied to the waste before the residuals may be land disposed; and
- No land disposal -- which prohibits land disposal of certain restricted hazardous wastes.

Concentration Levels

The majority of the LDR treatment standards promulgated to date are concentration levels. For wastes with treatment standards expressed as concentrations, any technology that can achieve the required levels may be used unless the technology is otherwise prohibited (i.e., the BDAT used by EPA to set the standards need not be used).

To establish a concentration level(s) for a specific waste code (e.g., K062), the Agency selects a subset of the hazardous constituents found in the waste (known as "BDAT constituents") and sets treatment standards for each of these constituents. Although these wastes may contain additional constituents, only the treatment standards for the "BDAT constituents" must be met before the wastes can be land disposed. The residues from treatment of an originally listed waste (e.g., ash, scrubber water) are also listed RCRA hazardous wastes (because of the "derived from" rule), and therefore, also are prohibited from land disposal unless they meet treatment standards for the waste code(s) of the original listed waste(s) from which they derive.

EPA has promulgated separate standards for wastewaters and nonwastewaters for treatment standards expressed as concentration levels. For LDRs, wastewaters normally are defined as wastes containing less than one percent total organic carbon (TOC) and less than one percent total suspended solids. All other materials (including soil and debris) are classified as nonwastewaters, except for F001-F005 wastes, for which only the TOC is used to define wastewaters.

Concentrations of BDAT constituents in solid residues from treatment must not exceed the

nonwastewater concentrations. Similarly, the concentration of BDAT constituents in wastewaters from treatment (e.g., incineration scrubber water) must not exceed the wastewater concentrations. **Highlight 1** provides an example of standards expressed as concentration levels for K062 waste.

Highlight 1 - TREATMENT STANDARDS FOR K062 WASTE*

Constituent	Treatment Standard Total Waste (mg/kg)	TCLP (mg/l)
Nonwastewater		
Total chromium	NA	0.094
Lead	NA	0.37
Wastewater		
Total chromium	0.32	NA
Nickel	0.44	NA
Lead	0.04	NA

* K062 waste is spent pickle liquor generated by the steel finishing operations of facilities within the iron and steel industry.

Specified Technologies

If a treatment standard is promulgated as a specified technology, that technology must be used to treat the waste unless an Equivalent Treatment Method Petition is approved by the Administrator. To be granted, such a petition must demonstrate that the alternative technology achieves an equivalent measure of performance. For example, the Agency has set the treatment standard for California list PCB wastes containing greater than 500 ppm PCBs as thermal destruction. These wastes must be incinerated to 99.9999 percent destruction and removal efficiency (DRE) under the LDRs before the ash from treatment may be land disposed unless a Petition allowing an equivalent treatment method is granted.

No Land Disposal

EPA sets a standard of no land disposal when, after examining available data, the Agency has determined that: the waste can be totally recycled (e.g., on-site, closed loop recycling); the waste is not currently being land disposed; the waste is no longer generated; or no residuals are anticipated from the use of the BDAT.

Although certain wastes may no longer be generated or land disposed, these wastes may still be found at Superfund sites. EPA has amended most of these waste codes, however, to apply only to wastes generated from the process described in the listing description and disposed of after the effective date of the prohibition (see 54 FR 18836, May 2, 1989). Therefore, CERCLA wastes ordinarily would not be subject to these standards.

COMPLYING WITH LDR TREATMENT STANDARDS

There are two types of tests for evaluating compliance that may be required, depending on how the treatment standards are promulgated: the **Total Waste Analysis (TWA)** measures the total concentration levels of the hazardous constituents in the waste or treatment residuals; and the **Toxicity Characteristic Leaching Procedure (TCLP)** measures concentration levels in the waste extract as a result of the TCLP test.

The TWA test generally is used for organic constituents when a removal or destruction technology is the BDAT. The TCLP generally is used for inorganics when an immobilization BDAT is the basis for the standard. However, the TCLP is also used for the solvent- and dioxin-containing waste LDR treatment standards and TWA is used for metals when BDAT is based on metals recovery. Site managers (OSCs and RPMs for on-site treatment and disposal actions) or treatment facilities (for off-site disposal actions) must test wastes after treatment and before land disposal to determine if the LDR treatment standards are met.

TREATMENT STANDARDS IN EFFECT FOR RCRA HAZARDOUS WASTES

Once a determination that the LDRs are ARARs has been made (see Superfund LDR guide #5), site managers must determine which of the specific LDR restrictions are in effect for their waste(s) of concern. If the Agency has promulgated a treatment standard for a restricted RCRA hazardous waste, either the LDR treatment standards or the minimum technology requirements will be in effect. If EPA has not set a treatment standard for a restricted RCRA hazardous waste, either the soft or hard hammer provisions will be in effect (see Superfund LDR Guide #4). The Agency has promulgated treatment standards for the following wastes:

Solvent-Containing RCRA Hazardous Wastes

For solvent-containing RCRA hazardous wastes (F001-F005), EPA has promulgated treatment standards expressed as concentration levels. Unlike most of the treatment standards for wastes containing organic constituents, the standards for the F001-F005 wastes are expressed as TCLP concentrations (40 CFR 268.41).

Dioxin-Containing RCRA Hazardous Wastes

Dioxin-containing wastes (F020-F023 and F026-F028), include chlorinated dibenzo-p-dioxins (CDDs), chlorinated dibenzofurans (CDFs), and chlorophenols. The treatment standards expressed as concentration levels are based on incineration of contaminated soil. Because current analytical methods cannot measure the concentration levels attainable by the BDAT, EPA set the treatment standards at the practical detection limits (i.e., 1 ppb) for most wastes. These standards are also based on a TCLP analysis (40 CFR 268.41).

Although the LDR treatment standards for dioxin-containing wastes are concentration levels, the dioxin-listing rule (50 FR 1978) requires special management standards for certain types of units:

- Incineration in accordance with 40 CFR 264.343 and 40 CFR 265.352;
- Thermal treatment to 99.9999 percent DRE in accordance with 40 CFR 265.383; or
- Tank treatment, in accordance with 40 CFR 264.200.

Highlight 2 describes the LDR restrictions in effect for solvent- and dioxin-containing RCRA hazardous wastes.

California List Hazardous Wastes

The California list rule established specified technologies as the treatment standards for certain California list wastes. Specifically, California list PCB and halogenated organic compound (HOC) wastes (except dilute HOC wastewaters) must be incinerated or burned in high-efficiency boilers or industrial furnaces. **Highlight 3** provides the LDR restrictions in effect for California list wastes.

First Third Wastes

The First Third scheduled wastes include those listed wastes that are intrinsically hazardous or are high-volume wastes. EPA promulgated treatment standards expressed as concentration levels and no land disposal based on TWA and TCLP for certain First Third wastes on August 17, 1988. First Third wastes that do not have promulgated treatment standards are restricted under the "soft hammer" provisions. **Highlight 4** describes the LDR restrictions in effect for certain First Third wastes for which the Agency has set treatment standards.

MINIMUM TECHNOLOGY REQUIREMENTS THAT APPLY DURING A NATIONAL CAPACITY EXTENSION

If during the promulgation of treatment standards the Agency determines that insufficient treatment capacity exists, the Agency may grant a national capacity extension for a period of up to two years. During the extension period, if wastes are to be land disposed in surface impoundments or landfills, the units must comply with the RCRA Subtitle C minimum technology requirements (i.e., double liner, leachate collection system, and ground-water monitoring) under RCRA 3005(j)(2) or (j)(4) or the receiving units must have a retrofitting waiver under RCRA 3004(o)(2) or 3005(j) to be considered equivalent to the minimum technology requirements.

Highlight 2 - EFFECTIVE DATES AND LDR RESTRICTIONS FOR SOLVENTS AND DIOXINS

TYPE OF RESTRICTED RCRA HAZARDOUS WASTE	TREATMENT STANDARD EFFECTIVE DATE	LDR RESTRICTION IN EFFECT AS OF NOVEMBER 8, 1988
F001 to F005 (spent solvent-containing wastes)	November 8, 1986 or November 8, 1988*	Treatment standards as concentration levels (TCLP)
F020 to F023, F026 to F028 (dioxin-containing wastes)	November 8, 1988	Treatment standards as concentration levels (TCLP)
Soil and debris contaminated with solvent/dioxin NOT from CERCLA/RCRA corrective actions	November 8, 1988	Treatment standards as concentration levels (TCLP)
Soil and debris contaminated with solvent/dioxin from CERCLA/RCRA corrective actions	November 8, 1990	Minimum technology requirements if disposed of in landfill or surface impoundment

* Soil and debris contamined with solvent-containing wastes were granted a statutory two-year extension to November 8, 1988. All other solvent-containing wastes became restricted on November 8, 1986.

Highlight 3 - EFFECTIVE DATES AND LDR RESTRICTIONS FOR CALIFORNIA LIST WASTES[a/]

TYPE OF RESTRICTED RCRA HAZARDOUS WASTE	TREATMENT STANDARD EFFECTIVE DATE	LDR RESTRICTION IN EFFECT AS OF NOVEMBER 8, 1988
California list PCBs	July 8, 1987	Treatment standards as specified technology(ies)
Liquid and non-liquid HOCs	November 8, 1988	Treatment standards as specified technology(ies)
Soil and debris contaminated with HOCs NOT from CERCLA/RCRA corrective actions	July 8, 1989	Minimum technology requirements if disposed of in landfill or surface impoundment
Soil and debris contaminated with HOCs from CERCLA/RCRA corrective actions	November 8, 1990	Minimum technology requirements if disposed of in landfill or surface impoundment

a/ See Superfund LDR Guide #4 for soft and hard hammer restrictions in effect for remaining California list wastes.

National capacity extensions for several types of wastes currently are in effect under the LDRs. For example, soil and debris from CERCLA and RCRA corrective actions that are contaminated with solvent, dioxin, and California list wastes have received an extension until November 8, 1990. All soil and debris contaminated with First Third wastes for which the BDAT is based on solids incineration have received an extension until August 8, 1990. Land disposal of wastes subject to national capacity extensions in units other than surface impoundments and landfills (e.g., waste piles, land treatment units) is not subject to the minimum technology requirements during such an extension.

Highlight 4 - EFFECTIVE DATES AND LDR RESTRICTIONS FOR CERTAIN FIRST THIRD WASTES[a/]

TYPE OF RESTRICTED RCRA HAZARDOUS WASTE	TREATMENT STANDARD EFFECTIVE DATE	LDR RESTRICTION IN EFFECT AS OF NOVEMBER 8, 1988
First Third wastes (not otherwise accounted for)[b/]	August 8, 1988	Treatment standards as concentration levels (TWA and TCLP) and (for a few waste codes) "no land disposal"
Soil and debris contaminated with First Third wastes for which BDAT is other than solids incineration	August 8, 1988	Treatment standards as concentration levels (TWA and TCLP) and "no land disposal"
Soil and debris contaminated with First Third wastes for which BDAT is solids incineration	August 8, 1990	Minimum technology requirements if disposed of in landfill or surface impoundment

a/ See Superfund LDR Guide #4 for soft and hard hammer restrictions in effect for First Third wastes.

b/ Except K048-K052 and K071, which were granted a two-year extension until August 8, 1990.

Superfund LDR Guide #4
Complying with the Hammer Restrictions Under Land Disposal Restrictions

25

United States Environmental Protection Agency
Office of Solid Waste and Emergency Response
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Superfund LDR Guide #4

Complying With the Hammer Restrictions Under Land Disposal Restrictions (LDRs)

CERCLA response actions must comply with the Resource Conservation and Recovery Act (RCRA) Land Disposal Restrictions (LDRs) when they are determined to be applicable or relevant and appropriate requirements (ARARs). Compliance with the LDRs will involve meeting the LDR treatment standards, minimum technology requirements during a national capacity extension, the soft or hard hammer restrictions, or satisfying the requirements of one of the other LDR compliance options (i.e., Treatability Variance, Equivalent Treatment Method Petition, No Migration Petition, or Delisting). **This guide discusses complying with LDR soft hammer and hard hammer provisions, which are restrictions on the disposal of hazardous wastes if EPA does not promulgate standards by the statutory deadlines.** More detailed guidance on Superfund compliance with the LDRs is being prepared by the Office of Solid Waste and Emergency Response (OSWER).

SOFT HAMMER WASTES

If the Agency fails to set treatment standards for First or Second Third wastes by their specified statutory deadline (August 8, 1988, and June 8, 1989, respectively), the wastes become restricted under the soft hammer provisions until EPA sets a treatment standard for them, or until May 8, 1990, when the "hard hammer" provisions will fall. The soft hammer provisions specify certain restrictions that may have to be met before the wastes can be land disposed. The hard hammer provisions prohibit all land disposal of the wastes. **Highlight 1** lists F- and K-wastes that are soft hammer wastes (as of June 8, 1989).

Soft Hammer Restrictions

The LDR soft hammer provisions prohibit the disposal of wastes in **surface impoundment** or **landfill units** unless:

(1) The receiving unit meets the RCRA minimum technology requirements (i.e., the unit must have two or more liners, a leachate collection system, and a ground-water monitoring system) or have an equivalent RCRA retrofitting waiver. These waivers are described in RCRA §3005(j)(2), which requires that a unit be at least one-quarter of a mile from an underground drinking source, and

Highlight 1 - F and K SOFT HAMMER WASTES (as of June 8, 1989)*

Waste Code	Physical Form	Waste Code	Physical Form
F006	wastewaters	K046	wastewaters and nonwastewaters
F019	wastewaters and nonwastewaters	K060	wastewaters
K004	wastewaters and nonwastewaters	K061	wastewaters
K008	wastewaters and nonwastewaters	K069	wastewaters and nonwastewaters
K011	wastewaters	K073	wastewaters and nonwastewaters
K013	wastewaters	K083	wastewaters and nonwastewaters
K014	wastewaters	K084	wastewaters and nonwastewaters
K017	wastewaters and nonwastewaters	K085	wastewaters and nonwastewaters
K021	wastewaters	K086	wastewaters
K022	wastewaters	K095	wastewaters
K025	wastewaters	K096	wastewaters
K029	wastewaters	K097	wastewaters and nonwastewaters
K031	wastewaters and nonwastewaters	K098	wastewaters and nonwastewaters
K035	wastewaters and nonwastewaters	K101	nonwastewaters
K036	wastewaters	K102	nonwastewaters
K041	wastewaters and nonwastewaters	K105	wastewaters and nonwastewaters
K042	wastewaters and nonwastewaters	K106	wastewaters and nonwastewaters

* For a complete listing of soft hammer waste restrictions, including all P and U wastes that are restricted, consult with EPA Headquarters.

RCRA §3005(j)(4), which requires that the unit be designed and operated such that there will be no migration of hazardous constituents into ground or surface water.

Waivers granted to units utilizing aggressive biological treatment (RCRA §3005(j)(3)) or undergoing corrective action (RCRA §3005(j)(13)) are not automatically considered equivalent to units in compliance with the minimum technology requirements. However, they may satisfy the §3004(o)(2) equivalency standard on a unit-by-unit basis.

(2) Site managers (OSCs, RPMs) certify that they have made a good faith effort to locate and to contract with treatment and recovery facilities for treatment that is "practically available." If such treatment is "practically available," the manager must use the best, practically available treatment (see **Highlight 2**) to treat the wastes before they are land disposed. If there is no "practically available" treatment, the soft hammer wastes may be disposed of without treatment in units meeting the requirements listed in (1).

Highlight 2 - GUIDE TO "PRACTICALLY AVAILABLE" AND "BEST" TREATMENT

- Practically Available - Site managers may consider cost in determining what treatments are "practically available" according to the following cost ratio:

$$\frac{\text{Cost of treatment, shipment, and disposal}}{\text{Cost of shipment and disposal}}$$

  - A ratio of 2.0 or greater (i.e., the cost of treatment at least doubles the cost of disposing of the waste without treatment) generally is not "practical";
  - A ratio between 1.5 and 2.0 generally is practical unless, on a case-by-case basis, the site manager can demonstrate why this treatment should not be considered practical; and
  - A ratio of 1.5 or less generally is practical.

This cost ratio is only a guideline for making decisions about practically available treatments; it is not a rule.

- Best Treatment - Of the treatment technologies that are "practically available," site managers are required to use the technology that yields the greatest environmental benefit. In general, EPA favors recycling/recovery as the best method for treating a waste. The next best general category of treatment is destruction (thermal or chemical), especially for organic wastes. Where neither recovery nor destruction is available or appropriate, immobilization of the wastes may be considered "best," especially for inorganic wastes.

Soft hammer wastes disposed of in units other than surface impoundments or landfills do not have to meet the soft hammer restrictions before land disposal. However, these wastes must comply with the LDR notification requirements and other LDR restrictions, such as storage prohibition. (The storage prohibition restricts the storage of soft hammer wastes unless it is solely for the purpose of accumulating sufficient quantities to facilitate proper treatment, recovery, or disposal.)

Soft Hammer Requirements for Notifications, Certifications, and Demonstrations

When soft hammer wastes are land disposed or treated off-site, site managers must comply with the LDR notification, certification, and demonstration requirements. When treatment and land disposal occur on-site, site managers must only meet the demonstration requirements. (The notification and certification requirements are administrative requirements and do not have to be met for on-site actions.) The specific notification requirements, including to whom and when they must be sent and the required language from 40 CFR Part 268, are shown in **Highlight 3** for each of these categories.

California List and Soft Hammer Overlap

Certain soft hammer wastes also may be California list wastes, in which case they may be subject either to the California list or soft hammer requirements. If a waste is restricted by soft hammer and California list restrictions, site managers should meet the more stringent standard for the waste.

- If treatment standards have been promulgated for a California list waste that is also a soft hammer, the California list treatment standard must be met for the waste before it is land disposed of into any type of unit. In this case, the soft hammer restrictions and notification, certification, and demonstration requirements do not apply.

- If treatment standards have not been promulgated for a California list waste that is also a soft hammer, and the waste is to be land disposed in a surface impoundment or landfill, one of two situations may arise:

  (1) If treatment is "practically available," a site manager must use the "best" treatment to meet the soft hammer requirements.

  (2) If treatment is not "practically available," the waste still must, at a minimum, be treated to below the California list prohibition levels before being land disposed to satisfy the California list restrictions.

Highlight 3 - SOFT HAMMER NOTIFICATION, CERTIFICATION, AND DEMONSTRATION REQUIREMENTS

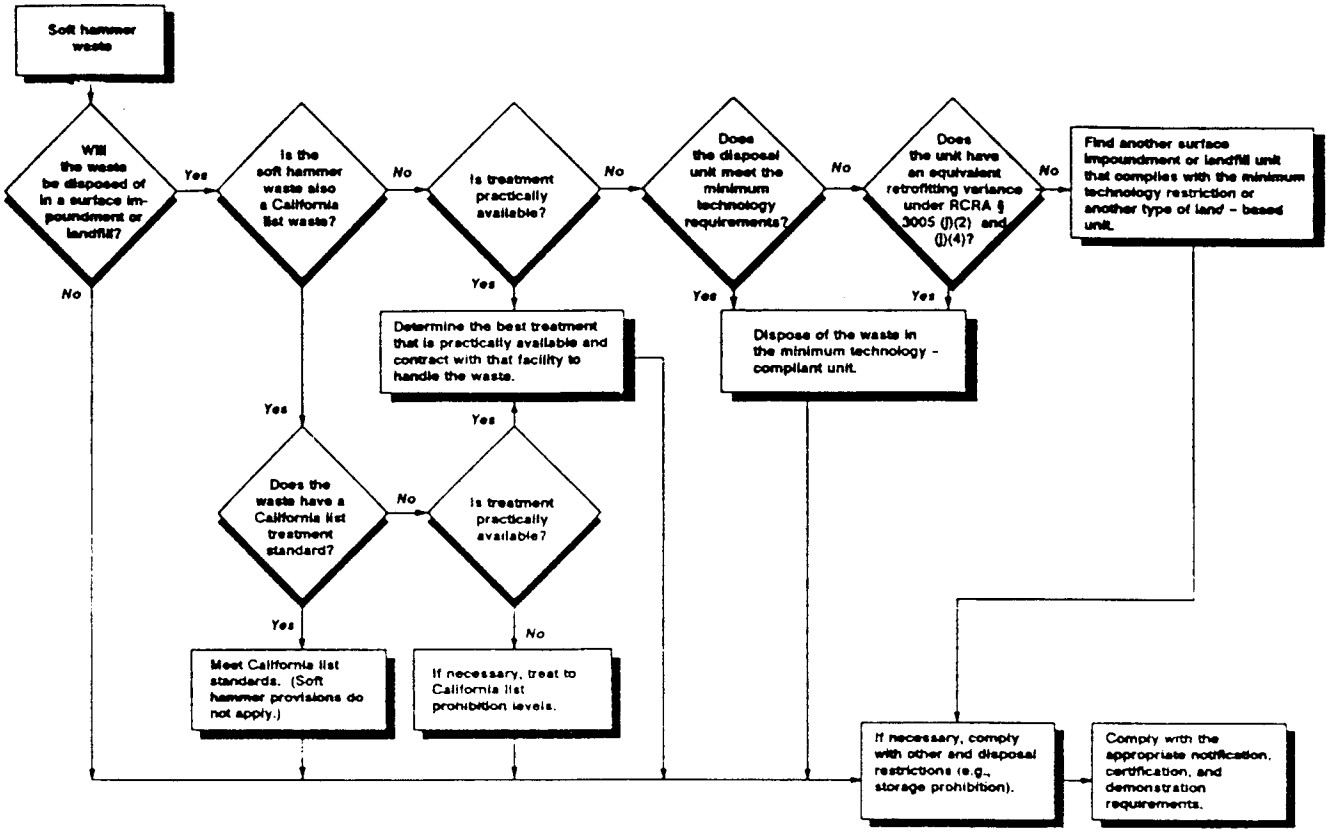
REQUIREMENT	SENT TO	WHEN	REQUIRED INFORMATION
IF LAND DISPOSAL OCCURS IN SURFACE IMPOUNDMENT OR LANDFILL UNITS			
NOTIFICATION (off-site only)	Treatment or disposal facility receiving waste	With each waste shipment	Notification that the waste is a soft hammer waste. Specific information includes: - EPA hazardous waste number; - Any applicable prohibitions (e.g., soft hammer provision); - Manifest number associated with shipment of waste; and - Waste analysis data, where available.
CERTIFICATION - If treatment is not practically available (off-site only)	EPA Regional Administrator and Disposal facility receiving waste	At time of first waste shipment and copy with each waste shipment	Certification should appear as follows: "EPA certifies under penalty of law that the requirements of 40 CFR 268.8(a)(1) have been met and that disposal in a landfill or surface impoundment is the only practical alternative to treatment currently available. EPA believes that the information submitted is true, accurate, and complete. EPA is aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."
CERTIFICATION - If treatment is practically available (off-site only)	EPA Regional Administrator and Treatment facility receiving waste	At time of first waste shipment and copy with each waste shipment	Certification should appear as follows: "EPA certifies under penalty of law that the requirements of 40 CFR 268.8(a)(1) have been met and that the agency has contracted to treat its waste (or will otherwise provide treatment) by the practically available technology which yields the greatest environmental benefit, as indicated in its demonstration. EPA believes that the information submitted is true, accurate, and complete. EPA is aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."
DEMONSTRATION - If no treatment is available (off-site and on-site)	EPA Regional Administrator	At time of first waste shipment	List of facilities and facility officials contacted, addresses, telephone numbers, and contact dates. Also, a written discussion of when treatment or recovery is not practical for the waste.
DEMONSTRATION - If treatment is available (off-site and on-site)	EPA Regional Administrator	At time of first waste shipment	List of facilities and facility officials contacted, addresses, telephone numbers, and contact dates. Provide information on the chosen treatment technology selected because it provides the greatest environmental benefit.

In both cases, site managers must meet the appropriate soft hammer notification, certification, and demonstration requirements.

If the waste will be land disposed in a unit other than a surface impoundment or landfill (e.g., waste pile), the waste must, at a minimum, be treated below the California list prohibition level before being land disposed. The soft hammer restrictions do not apply, and a site manager does not have to meet the soft hammer notification, certification, and demonstration requirements.

More information on California list wastes and their overlap with soft hammer wastes is found in LDR Guide #2. A step-by-step process to comply with the soft hammer restrictions is shown in **Highlight 4**.

Highlight 4 - IDENTIFYING SOFT HAMMER WASTE RESTRICTIONS



HARD HAMMER WASTES

The hard hammer provisions prohibit land disposal of restricted wastes if EPA fails to promulgate treatment standards by the statutory deadlines for solvent- and dioxin-containing and California list wastes and by May 8, 1990, for all of the scheduled wastes. The deadlines for these wastes are shown in **Highlight 5**. At present, the hard hammer provisions have only fallen for California list cyanides and metals. EPA has also codified statutory prohibition levels for California list corrosive wastes and dilute HOC wastewaters. Codification of the prohibition levels has the same effect as letting the hard hammer fall: land disposal of these wastes is prohibited when wastes are found in concentrations above the prohibition levels.

There are only two exceptions to the prohibition on land disposal of the hard hammer wastes: delisting and a No-Migration Petition. Delisting is a general option for demonstrating that a listed waste is no longer hazardous that is available under RCRA §260.20 and §260.22. The process to obtain No-Migration Petitions is specified in RCRA §268.6. To obtain a Petition, disposal facilities demonstrate that there will be no migration of hazardous constituents from the disposal unit or injection zone for as long as the waste remains hazardous. This is a rulemaking petition and is expected to require extensive documentation.

Highlight 5: HARD HAMMER DEADLINES

Waste	Hard Hammer Statutory Deadline
Solvent & dioxin wastes	November 8, 1986
California list wastes	July 8, 1987
CERCLA/RCRA corrective action soil and debris contaminated with solvent and dioxin and California list wastes	November 8, 1988
Scheduled wastes (1st Third, 2nd Third, and 3rd Third wastes)	May 8, 1990

Superfund LDR Guide #5
Determining When Land Disposal Restrictions are <u>Applicable</u> to CERCLA Response Actions

26

United States Environmental Protection Agency

Office of Solid Waste and Emergency Response

Directive: 9347.3-05FS
July 1989

EPA

Superfund LDR Guide #5

Determining When Land Disposal Restrictions (LDRs) Are Applicable to CERCLA Response Actions

CERCLA Section 121(d)(2) specifies that on-site Superfund remedial actions shall attain "other Federal standards, requirements, criteria, limitations, or more stringent State requirements that are determined to be legally applicable or relevant and appropriate (ARAR) to the specified circumstances at the site." In addition, the National Contingency Plan (NCP) requires that on-site removal actions attain ARARs to the extent practicable. Off-site removal and remedial actions must comply with legally applicable requirements. **This guide outlines the process used to determine whether the Resource Conservation and Recovery Act (RCRA) land disposal restrictions (LDRs) established under the Hazardous and Solid Waste Amendments (HSWA) are "applicable" to a CERCLA response action.** More detailed guidance on Superfund compliance with the LDRs is being prepared by the Office of Solid Waste and Emergency Response (OSWER).

For the LDRs to be applicable to a CERCLA response, the action must constitute placement of a restricted RCRA hazardous waste. Therefore, site managers (OSCs, RPMs) must answer three separate questions to determine if the LDRs are applicable:

(1) Does the response action constitute placement?

(2) Is the CERCLA substance being placed also a RCRA hazardous waste? and if so

(3) Is the RCRA waste restricted under the LDRs?

Site managers also must determine if the CERCLA substances are California list wastes, which are a distinct category of RCRA hazardous wastes restricted under the LDRs (see Superfund LDR Guide #2).

(1) DOES THE RESPONSE CONSTITUTE PLACEMENT?

The LDRs place specific restrictions (e.g., treatment of waste to concentration levels) on RCRA hazardous wastes prior to their placement in land disposal units. Therefore, a key a[illegible]n is whether the response action will constitute placement of wastes into a land disposal unit. As defined by RCRA, land disposal units include landfills, surface impoundments, waste piles, injection wells, land treatment facilities, salt dome formations, underground mines or caves, and concrete bunkers or vaults. If a CERCLA response includes disposal of wastes in any of these types of off-site land disposal units, placement will occur. However, uncontrolled hazardous waste sites often have widespread and dispersed contamination, making the concept of a RCRA unit less useful for actions involving on-site disposal of wastes. Therefore, to assist in defining when "placement" does and does not occur for CERCLA actions involving on-site disposal of wastes, EPA uses the concept of "areas of contamination" (AOCs), which may be viewed as equivalent to RCRA units, for the purposes of LDR applicability determinations.

An AOC is delineated by the areal extent (or boundary) of contiguous contamination. Such contamination must be continuous, but may contain varying types and concentrations of hazardous substances. Depending on site characteristics, one or more AOCs may be delineated. **Highlight 1** provides some examples of AOCs.

Highlight 1: EXAMPLES OF AREAS OF CONTAMINATION (AOCs)

- A waste source (e.g., waste pit, landfill, waste pile) and the surrounding contaminated soil.
- A waste source, and the sediments in a stream contaminated by the source, where the contamination is continuous from the source to the sediments.*
- Several lagoons separated only by dikes, where the dikes are contaminated and the lagoons share a common liner.

* The AOC does not include any contaminated surface or ground water that may be associated with the land-based waste source.

For on-site disposal, placement occurs when wastes are moved from one AOC (or unit) into another AOC (or unit). Placement does not occur when wastes are left in place, or moved within a single AOC. **Highlight 2** provides scenarios of when placement does and does not occur, as defined in the proposed NCP. The Agency is current reevaluating the definition of placement prior to the promulgation of the final NCP, and therefore, these scenarios are subject to change.

Highlight 2: PLACEMENT

Placement does occur when wastes are:

- Consolidated from different AOCs into a single AOC;
- Moved outside of an AOC (for treatment or storage, for example) and returned to the same or a different AOC; or
- Excavated from an AOC, placed in a separate unit, such as an incinerator or tank that is within the AOC, and redeposited into the same AOC.

Placement does not occur when wastes are:

- Treated in situ;
- Capped in place;
- Consolidated within the AOC; or
- Processed within the AOC (but not in a separate unit, such as a tank) to improve its structural stability (e.g., for capping or to support heavy machinery).

In summary, if placement on-site or off-site does not occur, the LDRs are not applicable to the Superfund action.

(2) IS THE CERCLA SUBSTANCE A RCRA HAZARDOUS WASTE?

Because a CERCLA response must constitute placement of a restricted RCRA hazardous waste for the LDRs to be applicable, site managers must evaluate whether the contaminants at the CERCLA site are RCRA hazardous wastes. **Highlight 3** briefly describes the two types of RCRA hazardous wastes --listed and characteristic wastes.

Highlight 3: RCRA HAZARDOUS WASTES

A RCRA **solid waste*** is hazardous if it is listed or exhibits a hazardous characteristic.

Listed RCRA Hazardous Wastes

Any waste listed in Subpart D of 40 CFR 261, including:

- F waste codes (Part 261.31)
- K waste codes (Part 261.32)
- P waste codes (Part 261.33(e))
- U waste codes (Part 261.33(f))

Characteristic RCRA Hazardous Wastes

Any waste exhibiting one of the following characteristics, as defined in 40 CFR 261:

- Ignitability
- Corrosivity
- Reactivity
- Extraction Procedure (EP) Toxicity

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* A solid waste is any material that is discarded or disposed of (i.e., abandoned, recycled in certain ways, or considered inherently waste-like). The waste may be solid, semi-solid, liquid, or a contained gaseous material. Exclusions from the definition (e.g., domestic sewage sludge) appear in 40 CFR 261.4(a). Exemptions (e.g., household wastes) are found in 40 CFR 261.4(b).

Site managers are not required to presume that a CERCLA hazardous substance is a RCRA hazardous waste unless there is affirmative evidence to support such a finding. Site managers, therefore, should use "reasonable efforts" to determine whether a substance is a RCRA listed or characteristic waste. (Current data collection efforts during CERCLA removal and

remedial site investigations should be sufficient for this purpose.) For listed hazardous wastes, if manifests or labels are not available, this evaluation likely will require fairly specific information about the waste (e.g., source, prior use, process type) that is "reasonably ascertainable" within the scope of a Superfund investigation. Such information may be obtained from facility business records or from an examination of the processes used at the facility. For characteristic wastes, site managers may rely on the results of the tests described in 40 CFR 261.21 - 261.24 for each characteristic or on knowledge of the properties of the substance. Site managers should work with Regional RCRA staff, Regional Counsel, State RCRA staff, and Superfund enforcement personnel, as appropriate, in making these determinations.

In addition to understanding the two categories of RCRA hazardous wastes, site managers will also need to understand the derived-from rule, the mixture rule, and the contained-in interpretation to identify correctly whether a CERCLA substance is a RCRA hazardous waste. These three principles, as well as an introduction to the RCRA delisting process, are described below.

Derived-from Rule (40 CFR 261.3(c)(2))

The derived-from rule states that any solid waste derived from the treatment, storage, or disposal of a listed RCRA hazardous waste is itself a listed hazardous waste (regardless of the concentration of hazardous constituents). For example, ash and scrubber water from the incineration of a listed waste are hazardous wastes on the basis of the derived-from rule. Solid wastes derived from a characteristic hazardous waste are hazardous wastes only if they exhibit a characteristic.

Mixture Rule (40 CFR 261.3(a)(2))

Under the mixture rule, when any solid waste and a listed hazardous waste are mixed, the entire mixture is a listed hazardous waste. For example, if a generator mixes a drum of listed F006 electroplating waste with a non-hazardous wastewater (wastewaters are solid wastes - see **Highlight 3**), the entire mixture of the F006 and wastewater is a listed hazardous waste. Mixtures of solid wastes and characteristic hazardous wastes are hazardous only if the mixture exhibits a characteristic.

Contained-in Interpretation (OSW Memorandum dated November 13, 1986)

The contained-in interpretation states that any mixture of a non-solid waste and a RCRA listed hazardous waste must be managed as a hazardous waste as long as the material contains (i.e., is above health-based levels) the listed hazardous waste. For example, if soil or ground water (i.e., both non-solid wastes) contain an F001 spent solvent, that soil or ground water must be managed as a RCRA hazardous waste, as long as it "contains" the F001 spent solvent.

Delisting (40 CFR 260.20 and .22)

To be exempted from the RCRA hazardous waste "system," a listed hazardous waste, a mixture of a listed and solid waste, or a derived-from waste must be delisted (according to 40 CFR 260.20 and .22). Characteristic hazardous wastes never need to be delisted, but can be treated to no longer exhibit the characteristic. A contained-in waste also does not have to be delisted; it only has to "no longer contain" the hazardous waste.

If site managers determine that the hazardous substance(s) at the site is a RCRA hazardous waste(s), they should also determine whether that RCRA waste is a California list waste. California list wastes are a distinct category of RCRA wastes restricted under the LDRs (see Superfund LDR Guide #2).

(3) IS THE RCRA WASTE RESTRICTED UNDER THE LDRs?

If a site manager determines that a CERCLA waste is a RCRA hazardous waste, this waste also must be restricted for the LDRs to be an applicable requirement. A RCRA hazardous waste becomes a restricted waste on its HSWA statutory deadline or sooner if the Agency promulgates a standard before the deadline. Because the LDRs are being phased in over a period of time (see **Highlight 4**), site managers may need to determine what type of restriction is in

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Highlight 4: LDR STATUTORY DEADLINES

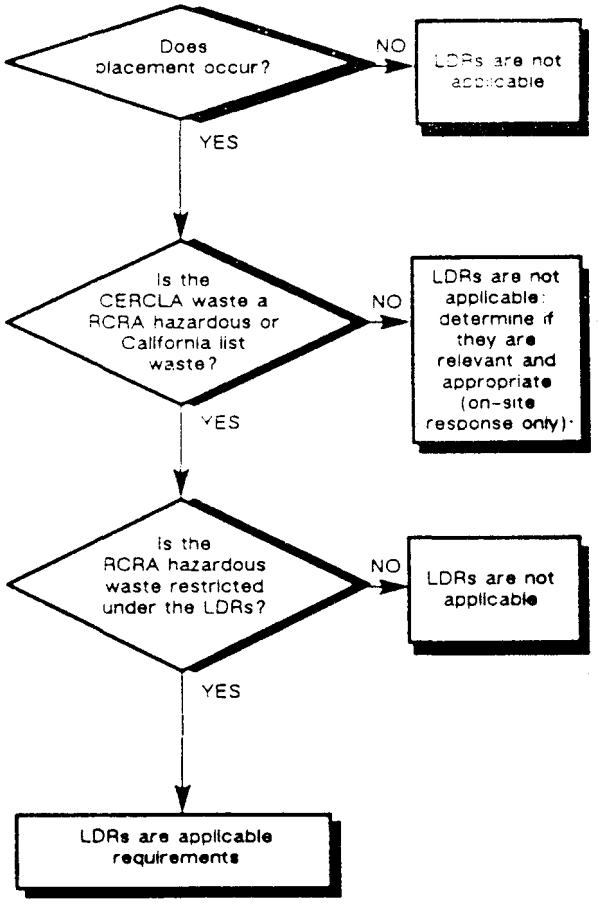
Waste	Statutory Deadline
Spent Solvent and Dioxin-Containing Wastes	November 8, 1986
California List Wastes	July 8, 1987
First Third Wastes	August 8, 1988
Spent Solvent, Dioxin-Containing, and California List Soil and Debris From CERCLA/RCRA Corrective Actions	November 8, 1988
Second Third Wastes	June 8, 1989
Third Third Wastes	May 8, 1990
Newly Identified Wastes	Within 6 months of identification as a hazardous waste

effect at the time placement is to occur. For example, if the RCRA hazardous wastes at a site are currently under a national capacity extension when the CERCLA decision document is signed, site managers should evaluate whether the response action will be completed before the extension expires. If these wastes are disposed of in surface impoundments or landfills prior to the expiration of the extension, the receiving unit would have to meet minimum technology requirements, but the wastes would not have to be treated to meet the LDR treatment standards.

APPLICABILITY DETERMINATIONS

If the site manager determines that the LDRs are applicable to the CERCLA response based on the previous three questions, the site manager must: (1) comply with the LDR restriction in effect, (2) comply with the LDRs by choosing one of the LDR compliance options (e.g., Treatability Variance, No Migration Petition), or (3) invoke an ARAR waiver (available only for on-site actions). If the LDRs are determined not to be applicable, then, for on-site actions only, the site manager should determine if the LDRs are relevant and appropriate. The process for determining whether the LDRs are applicable to a CERCLA action is summarized in **Highlight 5**.

Highlight 5 - DETERMINING WHEN LDRS ARE APPLICABLE REQUIREMENTS



Superfund LDR Guide #6A (2nd Edition)
Obtaining a Soil and Debris Treatability Variance for Remedial Actions

27

United States Environmental Protection Agency
Office of Solid Waste and Emergency Response
Superfund Publication: 9347.3-06FS
September 1990

EPA

Superfund LDR Guide #6A (2nd Edition)
Obtaining a Soil and Debris Treatability Variance for Remedial Actions

Office of Emergency and Remedial Response
Hazardous Site Control Division

Quick Reference Fact Sheet

The Office of Emergency and Remedial Response (OERR) issued a series of Superfund LDR Guides in July and December of 1989. This series included: *Overview of RCRA Land Disposal Restrictions (LDRs)* (Superfund LDR Guide #1); *Complying with the California List Restrictions* (Superfund LDR Guide #2); *Treatment Standards and Minimum Technology Requirements Under the LDRs* (Superfund LDR Guide #3); *Complying with the Hammer Restrictions Under the LDRs* (Superfund LDR Guide #4); *Determining When the LDRs are Applicable to CERCLA Responses* (Superfund LDR Guide #5); *Obtaining a Soil and Debris Treatability Variance for Remedial* (Superfund LDR Guide #6A) and *Removal* (Superfund LDR Guide #6B) *Actions*; and *Determining When the LDRs are Relevant and Appropriate to CERCLA Responses* (Superfund LDR Guide #7). Since the issuance of these guides, the Environmental Protection Agency, with cooperation from outside parties (e.g., environmental groups, industry representatives), has conducted an analysis of the potential impacts associated with applying the LDR treatment standards to Superfund and RCRA Corrective Action cleanups. As a result of these analyses, it was decided that the Agency will promulgate a third set of treatment standards (in addition to the wastewater and nonwastewater categories currently in effect) specifically for soil and debris wastes. In the interim, there is the presumption that CERCLA response actions involving the placement of soil and debris contaminated with RCRA restricted wastes will utilize a Treatability Variance to comply with the LDRs and that, under these variances, the treatment levels outlined in Superfund LDR Guide #6A will serve as alternative "treatment standards." **This guide (a revision to the original Superfund LDR Guide #6A) has been prepared to outline the process for obtaining and complying with a Treatability Variance for soil and debris that are contaminated with RCRA hazardous wastes until such time that the Agency promulgates treatment standards for soil and debris.**

BASIS FOR A TREATABILITY VARIANCE

When promulgating the LDR treatment standards, the Agency recognized that treatment of wastes to the LDR treatment standards would not always be possible or appropriate. In addition, the Agency recognized the importance of ensuring that the LDRs do not unnecessarily restrict the development and use of alternative and innovative treatment technologies for remediating hazardous waste sites. Therefore, a Treatability Variance process (40 CFR §268.44) is available to comply with the LDRs when a Superfund waste differs significantly from the waste used to set the LDR treatment standard such that:

- The LDR standard cannot be met; or
- The best demonstrated available technology (BDAT) used to set the standard is inappropriate for the waste.

Superfund site managers (OSCs, RPMs) should seek a Treatability Variance to comply with the LDRs when managing restricted soil and debris

Highlight 1: SOIL AND DEBRIS

Soil. Soil is defined as materials that are primarily of geologic origin such as sand, silt, loam, or clay, that are indigenous to the natural geologic environment at or near the CERCLA site. (In many cases, soil is mixed with liquids, sludges, and/or debris.)

Debris. Debris is defined as materials that are primarily non-geologic in origin, such as grass, trees, stumps, and man-made materials such as concrete, clothing, partially buried whole or empty drums, capacitors, and other synthetic manufactured materials, such as liners. (It does not include synthetic organic chemicals, but may include materials contaminated with these chemicals).

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185

wastes (see **Highlight 1**) because the LDR treatment standards are based on treating less complex matrices of industrial process wastes (except for the dioxin standards, which are based on treating contaminated soil). A Treatability Variance does not remove the requirement to treat restricted soil and debris wastes. Rather, under a Treatability Variance, alternate treatment levels based on data from actual treatment of soil, or best management practices for debris, become the "treatment standard" that must be met.

COMPLYING WITH A TREATABILITY VARIANCE FOR SOIL AND DEBRIS WASTES

Soil Wastes

Once site managers have identified the RCRA waste codes present at the site, the next step is to identify the BDAT constituents of those RCRA waste codes and to divide these constituents into one of the structural/functional groups shown in column 1 of **Highlight 2**. After dividing the BDAT constituents into their respective structural/functional groups, the next step is to compare the concentration of each constituent with the **threshold concentration** (see column 3 of **Highlight 2**) and to select the appropriate concentration level or percent reduction range. If the concentration of the restricted constituent is less than the threshold concentration, the waste should be treated to within the concentration range. If the waste concentration is above the threshold, the waste should be treated to reduce the concentration of the waste to within the specified percent reduction range. Once the appropriate treatment range is selected, the third step is to identify and select a specific technology

Highlight 2: ALTERNATE TREATABILITY VARIANCE LEVELS AND TECHNOLOGIES FOR STRUCTURAL/FUNCTIONAL GROUPS

Structural Functional Groups	Concentration Range (ppm)	Threshold Concentration (ppm)	Percent Reduction Range	Technologies that achieved recommended effluent concentration guidance**
ORGANICS	**Total Waste Analysis/***	**Total Waste Analysis/***		
Halogenated Non-Polar Aromatics	0.5 - 10	100	90 - 99.9	Biological Treatment, Low Temp. Stripping, Soil Washing, Thermal Destruction
Dioxins	0.00001 - 0.05	0.5	90 - 99.9	Dechlorination, Soil Washing, Thermal Destruction
PCBs	0.1 - 10	100	90 - 99.9	Biological Treatment, Dechlorination, Soil Washing, Thermal Destruction
Herbicides	0.002 - 0.02	0.2	90 - 99.9	Thermal Destruction
Halogenated Phenols	0.5 - 40	400	90 - 99	Biological Treatment, Low Temp. Stripping, Soil Washing, Thermal Destruction
Halogenated Aliphatics	0.5 - 2	40	95 - 99.9	Biological Treatment, Low Temp. Stripping, Soil Washing, Thermal Destruction
Halogenated Cyclics	0.5 - 20	200	90 - 99.9	Thermal Destruction
Nitrated Aromatics	2.5 - 10	10,000	99.9 - 99.99	Biological Treatment, Soil Washing Thermal Destruction
Heterocyclics	0.5 - 20	200	90 - 99.9	Biological Treatment, Low Temp. Stripping, Soil Washing, Thermal Destruction
Polynuclear Aromatics	0.5 - 20	400	95 - 99	Biological Treatment, Low Temp. Stripping, Soil Washing, Thermal Destruction
Other Polar Organics	0.5 - 10	100	90 - 99	Biological Treatment, Low Temp. Stripping, Soil Washing, Thermal Destruction
INORGANICS	**TCLP**	**TCLP**		
Antimony	0.1 - 0.2	2	90 - 99	Immobilization
Arsenic	0.30 - 1	10	90 - 99.9	Immobilization, Soil Washing
Barium	0.1 - 40	400	90 - 99	Immobilization
Chromium	0.5 - 6	120	95 - 99.9	Immobilization, Soil Washing
Nickel	0.5 - 1	20	95 - 99.9	Immobilization, Soil Washing
Selenium	0.005	0.05	90 - 99	Immobilization
Vanadium	0.2 - 20	200	90 - 99	Immobilization
Cadmium	0.2 - 2	40	95 - 99.9	Immobilization, Soil Washing
Lead	0.1 - 3	300	99 - 99.9	Immobilization, Soil Washing
Mercury	0.0002 - 0.008	0.08	90 - 99	Immobilization

* *TCLP also may be used when evaluating waste with relatively low levels of organics that have been treated through an immobilization process.*

** *Other technologies may be used if treatability studies or other information indicates that they can achieve the necessary concentration or percent-reduction range.*

that can achieve the necessary concentration or percent reduction. Column 5 of **Highlight 2** lists technologies that (based on existing performance data) can attain the alternative Treatability Variance levels.

During the implementation of the selected treatment technology, periodic analysis using the appropriate testing procedure (i.e., total waste analysis for organics and TCLP for inorganics) will be required to ensure the alternate treatment levels for the BDAT constituents requiring control are being attained and thus can be land disposed without further treatment.

Because of the variable and uncertain characteristics associated with unexcavated wastes, from which only sampling data are available, treatment systems generally should be designed to achieve the more stringent end of the treatment range (e.g., 0.5 for chromium, see column 2 of **Highlight 2**) to ensure that the treatment residuals from the most contaminated portions of the waste fall below the "no exceedance" levels (e.g., 6.0 ppm for chromium). Should data indicate that the treatment levels set through the Treatability Variance are not being attained (i.e., treatment residuals are greater than the "no exceedance" level), site managers should consult with EPA Headquarters.

Debris Wastes

Site managers should use the same process for obtaining a Treatability Variance described above for types of debris that are able to be treated to the alternate treatment levels (e.g., paper, plastic). However, for most types of debris (e.g., concrete, steel pipes), which generally cannot be treated, site managers should use best management practices. Depending on the specific characteristics of the debris, these practices may include decontamination (e.g., triple rinsing) or destruction.

OBTAINING A TREATABILITY VARIANCE FOR SOIL AND DEBRIS WASTES

Once it is determined that a CERCLA waste is a soil or debris, and that compliance with the LDRs will be required (i.e., the wastes contain restricted RCRA waste(s) and placement will occur), site managers should initiate the process of obtaining a Variance. For remedial actions this will involve: (1) documenting the intent to comply with the LDRs through a Treatability Variance in the FS Report; (2) announcing the intent to comply through a Treatability Variance in the Proposed Plan; and (3) granting of the Treatability Variance by the Regional Administrator or the

Highlight 3 - INFORMATION TO BE INCLUDED IN AN RI/FS TO DOCUMENT THE INTENT TO COMPLY WITH THE LDRs THROUGH A TREATABILITY VARIANCE FOR ON-SITE AND OFF-SITE CERCLA RESPONSE ACTIONS INVOLVING THE PLACEMENT OF SOIL AND DEBRIS CONTAMINATED WITH RESTRICTED RCRA WASTES

ON-SITE

- Description of the soil or debris waste and the source of the contamination;
- Description of the Proposed Action (e.g., "excavation, treatment, and off-site disposal");
- Intent to comply with the LDRs through a Treatability Variance; and
- For each alternative using a Treatability Variance to comply, the specific treatment level range to be achieved (see **Highlight 2** to determine these treatment levels).

OFF-SITE

For off-site Treatability Variances, the information above should be extracted from the RI/FS report and combined with the following information in a separate document:*

- Petitioner's name and address and identification of an authorized contact person (if different); and
- Statement of petitioner's interest in obtaining a Treatability Variance.

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* This document may be prepared after the ROD is signed (and Treatability Variance granted) but will need to be compiled prior to the first shipment of wastes (or treatment residuals) to the receiving treatment or disposal facility.

LDRs as an ARAR and indicate that a Treatability Variance is being used to comply.

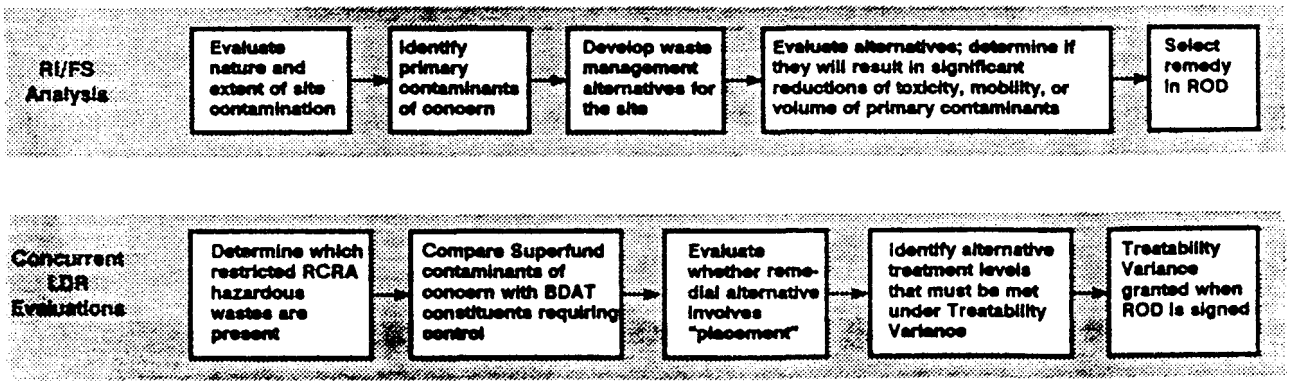
Under some circumstances, the need to obtain a Treatability Variance may not be evident until after a ROD is signed. For example, previously undiscovered evidence may be obtained during a remedial design/remedial action (RD/RA) that the CERCLA waste contains a RCRA restricted waste and the LDRs are then determined to be applicable. In such situations, a site manager would need to prepare an explanation of significant differences (ESD) from the ROD and make it available to the public to explain the need for a Treatability Variance. In addition, unlike other ESDs that do not require public comment under CERCLA section 117(c), if the ESD involves granting a Treatability Variance, an opportunity for public comment would be required to fulfill the public notice and comment requirements for a Treatability Variance under 40 CFR §268.44.

LDRs IN SUPERFUND ACTIONS

Because of the important role the LDRs may play in Superfund cleanups, site managers need to incorporate early in the RI/FS the necessary investigative and analytical procedures to determine if the LDRs are applicable for remedial alternatives that involve the "placement" of wastes. When the LDRs are applicable, site managers should determine if the treatment processes associated with the alternatives can attain either the LDR treatment standards or the alternate levels that would be established under a Treatability Variance.

Site managers must first evaluate whether restricted RCRA waste codes are present at the site, identify the BDAT constituents requiring control, and compare the BDAT constituents with the Superfund primary constituents of concern from the baseline risk assessment. This process identifies all of the constituents for which remediation may be required. Once the viable alternatives are identified in the FS, site managers should evaluate those involving the treatment and placement of restricted RCRA hazardous wastes to ensure their respective technology process(es) will attain the appropriate treatment levels (i.e., either LDR treatment standard or Treatability Variance alternate treatment levels for soil and debris containing restricted RCRA hazardous wastes) and, in accordance with Superfund goals, reductions of 90 percent or greater for Superfund primary contaminants of concern. The results of these evaluations are documented in the Proposed Plan and ROD. An illustration of the integration of LDRs and Superfund is shown in **Highlight 6.** An example of the process for complying with a Treatability Variance for contaminated soil and debris is presented in **Highlight 7.**

Highlight 6: LDRs IN THE RI/FS PROCESS



Assistant Administrator/OSWER when the ROD is signed.

FS Report

The FS Report should contain the necessary information (see **Highlight 3**) to document the intent to comply with the LDRs for soil and debris through a Treatability Variance. In the Detailed Analysis of Alternatives chapter of the FS Report, the discussion should specify the treatment level range(s) that the treatment technology would attain for each waste constituent restricted under the LDRs, as well as the Superfund primary contaminants of concern identified during the baseline risk assessment. In addition, under the Comparative Analysis of Alternatives section, when discussing the "Compliance with ARARs Criteria," site managers should indicate which alternatives will comply with the LDRs through the use of a Treatability Variance.

Proposed Plan

The intent to comply with the LDRs through a Treatability Variance for a particular alternative should be clearly stated in the Description of Alternatives section of the Proposed Plan. Because the Proposed Plan solicits public comment on all of the alternatives and not just the preferred option, the intent to obtain a Treatability Variance should be identified for every alternative for which a Variance would be used. This opportunity for public comment on the Proposed Plan fulfills the requirements for public notice and comment (off-site actions only) on the Treatability Variance as required in RCRA §268.44. Sample language for the Proposed Plan is provided in **Highlight 4**.

Highlight 4 - SAMPLE LANGUAGE FOR THE PROPOSED PLAN

Description of Alternatives section

This alternative will comply with the LDRs through a Treatability Variance under 40 CFR 268.44. This Variance will result in the use of [specify technology] to attain the Agency's interim "treatment levels/ranges" for the contaminated soil at the site (see Detailed Analysis of Alternatives Chapter of the FS Report for the specific treatment levels for each constituent).

Evaluation of Alternatives section, under "Compliance with ARARs"

The LDRs are ARARs for [Enter number] of [Enter total number of alternatives] remedial alternatives being considered. [Enter number] of the [Enter total number of alternatives] alternatives would comply with the LDRs through a Treatability Variance.

Highlight 5: SAMPLE LANGUAGE FOR A RECORD OF DECISION

Description of Alternatives section:

This alternative will comply with the LDRs through a Treatability Variance for the contaminated soil and debris. The treatment level range established through a Treatability Variance that [Enter technology] will attain for each constituent as determined by the indicated analyses are [Example shown below]:

Barium	*0.1 - 40 ppm (TCLP)*
Mercury	*0.0002 - 0.008 ppm (TCLP)*
Vanadium	*0.2 - 20 ppm (TCLP)*
TCE	*95-99.9% reduction (TWA)*
Cresols	*90-99% reduction (TWA)*

Record of Decision

A Treatability Variance is granted and becomes effective when the Record of Decision (ROD) is signed by the Regional Administrator or Assistant Administrator/OSWER. In the Description of Alternatives section, as part of the discussion of major applicable requirements associated with each remedial option, site managers should include a statement (as was done in the FS report) that a Treatability Variance will be used to comply with the LDRs, and list the treatment level range(s) that the selected technology will attain for each constituent. Sample language for the ROD is provided in **Highlight 5**.

In the Comparative Analysis section, under "Compliance with ARARs," site managers should indicate which of the alternatives will comply with the LDRs through a Treatability Variance. Under the Statutory Determination section (Compliance with ARARs), site managers should identify the

Highlight 7: IDENTIFICATION OF TREATMENT LEVELS FOR A TREATABILITY VARIANCE

As part of the RI, it has been determined that soils in one location at a site contain F006 wastes and cresols (which site records indicate were an F004 waste). Arsenic also was found in soils at a separate location. The baseline risk assessment identified cadmium, chromium, lead, and arsenic as primary contaminants of concern. The concentration range of all of the constituents found at the site included:

Constituent	Total Concentration (mg/kg)	TCLP (mg/l)	Constituent	Total Concentration (mg/kg)	TCLP (mg/l)
Cadmium	2,270 - 16,200	120 - 146	Nickel	100 - 140	1 - 6.5
Chromium	3,160 - 4,390	30 - 56	Silver	1 - 3	---
Cyanides	80 - 150	1 - 16	Cresols	50 - 600	.25 - 4
Lead	500 - 625	2 - 12.5	Arsenic	800 - 1,900	3 - 9

Four remedial alternatives are being considered: (1) Low temperature thermal stripping of soil contaminated with cresols followed by immobilization of the ash; (2) Immobilization of the soil in a mobile unit; (3) In-situ immobilization; and (4) Capping of wastes. Each of these alternatives must be evaluated to determine if they will result in significant reduction of the toxicity, mobility, or volume of the waste; whether "placement" occurs; and, if "placement" occurs, whether the treatment will attain the alternative treatment levels established through a Treatability Variance for the BDAT constituents requiring control.

STEP 1: IDENTIFY THE RESTRICTED CONSTITUENTS

- Because F006 and F004 wastes have been identified in soils at the site, the Superfund site manager must meet alternate treatment levels established through a Treatability Variance for the BDAT constituents. These constituents are: **Cadmium, Chromium, Lead, Nickel, Silver,** and **Cyanide** for F006 and **Cresols** for F004.

AND DIVIDE THE CONSTITUENTS INTO THEIR STRUCTURAL/FUNCTIONAL GROUPS (see Highlight 2):

- All of the F006 constituents are in the **Inorganics** structural/functional group.
- Cresols are in the **Other Polar Organic Compounds** structural/functional group.
- In accordance with program goals, the preferred remedy also should result in the effective reduction (i.e., at least 90 percent) of all primary constituents of concern (i.e., **Cadmium, Chromium, Lead, and Arsenic**).

STEP 2: COMPARE THE CONCENTRATION THRESHOLD FOUND IN HIGHLIGHT 2 TO THE CONCENTRATIONS FOUND AT THE SITE AND CHOOSE EITHER THE CONCENTRATION LEVEL RANGE OR PERCENT REDUCTION RANGE FOR EACH RESTRICTED CONSTITUENT.

Constituent	Site Concentration	Threshold Concentration	Appropriate Range: Concentration	Appropriate Range: Percent Reduction	Range to be achieved (compliance analysis)
Cadmium	120 - 146 ppm	> 40 ppm		X	95-99.9 Percent Reduction (TCLP)
Chromium	30 - 56 ppm	< 120 ppm	X		0.5 - 6 ppm (TCLP)
Lead	2 - 12.5 ppm	< 300 ppm	X		0.1 - 3 ppm (TCLP)
Nickel	1 - 6.5 ppm	< 20 ppm	X		0.5 - 1 ppm (TCLP)
Cresols (Total)	50 - 600 ppm	> 100 ppm	X		90-99 Percent Reduction (TCLP)
Cresols (TCLP)	.25 - 4 ppm			X	
Arsenic	3 - 9 ppm	< 10 ppm	X		0.27 - 1 ppm (TCLP)

STEP 3: IDENTIFY TREATMENT TECHNOLOGIES THAT MEET THE TREATMENT RANGES.

- **Highlight 2** lists the technologies that achieved the alternate treatment levels for each structural/functional group.
- Because cresols are present in relatively low concentrations (assumed for the purposes of this example), a TCLP may be used to determine if immobilization results in a sufficient reduction of mobility of this restricted RCRA hazardous waste. (Measures to address any volatilization of organics during immobilization processes will be necessary.)
- Based on the results of treatability tests conducted at the site, immobilization also will result in the effective reduction in leachability (i.e., at least 90 percent) of arsenic, a Superfund primary contaminant of concern.

Alternative	Effective Reduction of Toxicity, Mobility, Volume?	"Placement?"	Meet Treatability Variance Alternate Levels?
1. Low temperature stripping/ Immobilization	Yes	Yes	Yes
2. Immobilization in mobile unit	Yes	Yes	Yes
3. In-situ immobilization	Yes (Mobility)	No (LDRs not ARARs)	---
4. Capping in Place	No	No (LDRs not ARARs)	---

STEP 4: PREPARE PROPOSED PLAN, OBTAIN COMMENTS

- **Highlight 4** provides sample language for the Proposed Plan that announces the intent to comply with the LDRs through a Treatability Variance.

STEP 5: PREPARE ROD

- **Highlight 5** provides sample language for a ROD signed for a site that will comply with the LDRs through a Treatability Variance.

Superfund LDR Guide #6B
Obtaining a Soil and Debris Treatability Variance for Removal Actions

28

United States Environmental Protection Agency
Office of Solid Waste and Emergency Response
Superfund Publication: 9347.3-06BFS
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EPA

Superfund LDR Guide #6B

Obtaining a Soil and Debris Treatability Variance for Removal Actions

Office of Emergency and Remedial Response
Hazardous Site Control Division

Quick Reference Fact Sheet

The Office of Emergency and Remedial Response (OERR) issued a series of Superfund LDR Guides in July and December of 1989. This series included: *Overview of RCRA Land Disposal Restrictions (LDRs)* (Superfund LDR Guide #1); *Complying with the California List Restrictions* (Superfund LDR Guide #2); *Treatment Standards and Minimum Technology Requirements Under the LDRs* (Superfund LDR Guide #3); *Complying with the Hammer Restrictions Under the LDRs* (Superfund LDR Guide #4); *Determining When the LDRs are Applicable to CERCLA Responses* (Superfund LDR Guide #5); *Obtaining a Soil and Debris Treatability Variance for Remedial* (Superfund LDR Guide #6A) and *Removal* (Superfund LDR Guide #6B) *Actions*; and *Determining When the LDRs are Relevant and Appropriate to CERCLA Responses* (Superfund LDR Guide #7). Since the issuance of these guides, the Environmental Protection Agency, with cooperation from outside parties (e.g., environmental groups, industry representatives), has conducted an analysis of the potential impacts associated with applying the LDR treatment standards to Superfund and RCRA Corrective Action cleanups. As a result of these analyses, it was decided that the Agency will promulgate a third set of treatment standards (in addition to the wastewater and nonwastewater categories currently in effect) specifically for soil and debris wastes. In the interim, there is the presumption that CERCLA response actions involving the placement of soil and debris contaminated with RCRA restricted wastes will utilize a Treatability Variance to comply with the LDRs and that, under these variances, the treatment levels outlined in Superfund LDR Guide #6B will serve as alternative "treatment standards" for removal actions. **This guide has been prepared to outline the process for obtaining and complying with a Treatability Variance for soil and debris that are contaminated with RCRA hazardous wastes until such time that the Agency promulgates treatment standards for soil and debris.**

BASIS FOR A TREATABILITY VARIANCE

When promulgating the LDR treatment standards, the Agency recognized that treatment of wastes to the treatment standards established using the best demonstrated available technology (BDAT) would not always be possible or appropriate (RCRA §268.44). In addition, the Agency recognized the importance of ensuring that the LDRs do not unnecessarily restrict the development and use of alternative and innovative treatment technologies for remediating hazardous waste sites. Therefore, a Treatability Variance process is available to comply with the LDRs when a Superfund waste differs significantly from the waste used to set the LDR treatment standard such that:

- The LDR standard cannot be met; or
- The BDAT used to set the standard is inappropriate for the waste.

Highlight 1: SOIL AND DEBRIS

Soil. Soil is defined as materials that are primarily of geologic origin such as sand, silt, loam, or clay, that are indigenous to the natural geologic environment at or near the CERCLA site. (In many cases, soil is mixed with liquids, sludges, and/or debris.)

Debris. Debris is defined as materials that are primarily non-geologic in origin, such as grass, trees, stumps, and man-made materials such as concrete, clothing, partially buried whole or empty drums, capacitors, and other synthetic manufactured materials, such as liners. (It does not include synthetic organic chemicals, but may include materials contaminated with these chemicals).

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During on-site removal actions, on-scene coordinators (OSCs) must comply with the LDRs if the LDRs are ARARs and compliance with the LDRs is practicable. For removals involving off-site deposition, OSCs must simply determine if the LDRs are applicable. When managing restricted soil and debris wastes (see **Highlight 1**), it is presumed that OSCs will comply with the LDRs through a Treatability Variance because, except for the dioxin standards which are based on treating contaminated soil, the LDR treatment standards are based on treating less complex matrices of industrial process wastes. A Treatability Variance does not remove the requirement to treat restricted soil and debris wastes. Rather, under a Variance, an OSC selects alternate treatment levels the Agency has established, which are based on data from actual treatment of soil or best management practices for debris.

COMPLYING WITH A TREATABILITY VARIANCE FOR SOIL AND DEBRIS WASTES

Soils

Once the OSCs have identified the RCRA waste codes present at the site, the next step is to identify the BDAT constituents requiring control and to divide these constituents into one of the structural/functional groups shown in column 1 of **Highlight 2**. After dividing the BDAT constituents into their respective structural/functional groups, the next step is to compare the concentration of each constituent with the **threshold concentration** (see column 3 of **Highlight 2**) and to select the appropriate concentration level or percent reduction range. If the concentration of the restricted constituent is less than the threshold concentration, the waste should be treated to

Highlight 2: ALTERNATE TREATABILITY VARIANCE LEVELS AND TECHNOLOGIES FOR STRUCTURAL/FUNCTIONAL GROUPS

Structural Functional Groups	Concentration Range (ppm)	Threshold Concentration (ppm)	Percent Reduction Range	Technologies that achieved recommended effluent concentration guidance**
ORGANICS	**Total Waste Analysis/***	**Total Waste Analysis/***		
Halogenated Non-Polar Aromatics	0.5 - 10	100	90 - 99.9	Biological Treatment, Low Temp. Stripping, Soil Washing, Thermal Destruction
Dioxins	0.00001 - 0.05	0.5	90 - 99.9	Dechlorination, Soil Washing, Thermal Destruction
PCBs	0.1 - 10	100	90 - 99.9	Biological Treatment, Dechlorination, Soil Washing, Thermal Destruction
Herbicides	0.002 - 0.02	0.2	90 - 99.9	Thermal Destruction
Halogenated Phenols	0.5 - 40	400	90 - 99	Biological Treatment, Low Temp. Stripping, Soil Washing, Thermal Destruction
Halogenated Aliphatics	0.5 - 2	40	95 - 99.9	Biological Treatment, Low Temp. Stripping, Soil Washing, Thermal Destruction
Halogenated Cyclics	0.5 - 20	200	90 - 99.9	Thermal Destruction
Nitrated Aromatics	2.5 - 10	10,000	99.9 - 99.99	Biological Treatment, Soil Washing Thermal Destruction
Heterocyclics	0.5 - 20	200	90 - 99.9	Biological Treatment, Low Temp. Stripping, Soil Washing, Thermal Destruction
Polynuclear Aromatics	0.5 - 20	400	95 - 99	Biological Treatment, Low Temp. Stripping, Soil Washing, Thermal Destruction
Other Polar Organics	0.5 - 10	100	90 - 99	Biological Treatment, Low Temp. Stripping, Soil Washing, Thermal Destruction
INORGANICS	**TCLP**	**TCLP**		
Antimony	0.1 - 0.2	2	90 - 99	Immobilization
Arsenic	0.3 - 1	10	90 - 99.9	Immobilization, Soil Washing
Barium	0.1 - 40	400	90 - 99	Immobilization
Chromium	0.5 - 6	120	95 - 99.9	Immobilization, Soil Washing
Nickel	0.5 - 1	20	95 - 99.9	Immobilization, Soil Washing
Selenium	0.005	0.05	90 - 99	Immobilization
Vanadium	0.2 - 20	200	90 - 99	Immobilization
Cadmium	0.2 - 2	40	95 - 99.9	Immobilization, Soil Washing
Lead	0.1 - 3	300	99 - 99.9	Immobilization, Soil Washing
Mercury	0.0002 - 0.008	0.08	90 - 99	Immobilization

* *TCLP also may be used when evaluating waste in which organics are not a principal constituent that have been treated through an immobilization process.*

** *Other technologies may be used if treatability studies or other information indicates that they can achieve the necessary concentration or*

within the concentration range. If the waste concentration is above the threshold, the waste should be treated to reduce the concentration of the waste to within the specified percent reduction range. Once the appropriate treatment range is selected, the third step is to identify and select a specific technology that can achieve the necessary concentration or percent reduction. Column 5 of **Highlight 2** lists technologies that (based on existing performance data) can attain the alternative Treatability Variance levels.

For on-site actions, during the implementation of the selected treatment technology, periodic analysis using the appropriate testing procedure (i.e., total waste analysis for organics and TCLP for inorganics) will be required to ensure that the alternate treatment levels for the BDAT constituents requiring control are being attained, and thus, can be land-disposed without further treatment.

Because of the variable and uncertain characteristics associated with unexcavated wastes, from which only sampling data are available, treatment systems generally should be designed to achieve the more stringent end of the treatment range (e.g., 0.5 for chromium, see column 2 of **Highlight 2**) to ensure that the treatment residuals from the most contaminated portions of the waste fall below the "no exceedance" levels (e.g., 6.0 ppm for chromium). Should data indicate that the treatment levels set through the Treatability Variance are not being attained (i.e., treatment residuals are greater than the "no exceedance" level), OSCs should consult with the Response Operations Branch at Headquarters.

Debris Wastes

OSCs should use the same process described above for obtaining a Treatability Variance for types of debris that are able to be treated to the alternate treatment levels (e.g., paper, plastic). However, for most types of debris (e.g., concrete, steel pipes), which generally cannot be treated, OSCs should use best management practices. Depending on the specific characteristics of the debris, these practices may include decontamination (e.g., triple rinsing) or destruction.

OBTAINING A TREATABILITY VARIANCE FOR SOIL AND DEBRIS WASTES

Once it is determined that a CERCLA waste is a soil or debris, and that a Treatability Variance will be necessary (i.e., the LDRs are applicable and practicable for the removal action addressing soil and debris wastes, and there is a reasonable doubt that the LDR treatment standards can be met consistently for all the wastes), OSCs should

Highlight 3 - INFORMATION TO BE INCLUDED IN A TREATABILITY VARIANCE ACTION MEMORANDUM AND EE/CA TO OBTAIN A SOIL AND DEBRIS TREATABILITY VARIANCE DURING CERCLA REMOVAL ACTIONS

Information to be included in a Treatability Variance Memorandum and EE/CA for a soil and debris Treatability Variance during on-site and off-site removal actions is listed below. For off-site Treatability Variances, the complete list of documentation requirements should be combined and submitted as a separate document.

ON-SITE AND OFF-SITE

- Description of the soil or debris waste and the source of the contamination;
- Description of the Proposed Action (e.g., "excavation, treatment, and off-site disposal");
- Intent to comply with the LDRs through a Treatability Variance; and
- For the selected removal action (emergency and time-critical) or for each alternative for which a Treatability Variance is required (non-time-critical removals), the specific treatment level range to be achieved (see **Highlight 2** to determine these treatment levels and **Highlight 7** for an example of the variance process).

OFF-SITE ONLY

- Petitioner's name and address and identification of an authorized contact person (if different); and
- Statement of petitioner's interest in obtaining a Treatability Variance.

initiate the process of obtaining a Treatability Variance.

In general, for on-site removal actions, the Treatability Variance will be in the form of a memorandum attached to the Action Memorandum that documents the removal action to be taken. This attachment should include the necessary information to justify the need for a Treatability Variance (see **Highlight 3**). Treatability Variances for on-site removal actions are approved by Regional Administrators or their designees.

For off-site removal actions, an OSC must submit to Headquarters a formal Treatability Variance petition complying with the requirements of 40 CFR 268.44 for site-specific variances. Because most removal actions involve off-site actions, OSCs will generally have to prepare formal Treatability Variance petitions. The process also should include local notice and an opportunity for the public to comment, consistent with the NCP administrative record requirements in 40 CFR 300.820.

Processes for obtaining a Treatability Variance depend upon the type of removal action. These actions are classified according to the expediency required in a given situation: (1) emergency, (2) time-critical, and (3) non-time-critical. The process for obtaining a Treatability Variance for each of these removal actions is described below. Each of these actions are defined in the NCP (55 FR 8666, March 8, 1990).

Emergency and Time-Critical Actions

There is no formal procedure for identifying and analyzing alternatives for emergency and time-critical removal actions. Because of the need for a quick response to a release, the removal action selection process may occur at different stages of these removals, depending on the threats present.

Generally, a request for a Treatability Variance is a memorandum attached to the Action Memorandum. During emergency and some time-critical responses, however, there may not be sufficient information available about the need for a Treatability Variance when the Action Memorandum is signed. In those cases, the request for a Treatability Variance should be a memorandum (or formal petition, for off-site actions) that amends the Action Memorandum. Sample language for this Action Memorandum is provided in **Highlight 4**. In all cases, the Treatability Variance memorandum should be from the OSC to Regional Administrators or their designee who has the authority to approve Action Memoranda. Public comment on the Treatability Variance should be solicited, whenever possible, given the urgency of the situation, in accordance with the administrative record and public participation procedures described in the NCP (40 CFR 300.820).

Highlight 4 - SAMPLE LANGUAGE FOR THE ACTION MEMORANDUM

Because existing and available data do not demonstrate that the full-scale operation of this treatment technology can attain the LDR treatment standards consistently for all soil or debris wastes to be addressed by this action, this selected removal alternative will comply with the LDRs through a Treatability Variance. The treatment level range established through a Treatability Variance and achieved through [specify technology] will attain the Agency's interim "treatment levels/ranges" for each constituent restricted at the site.

Non-Time-Critical Actions

For these actions, sufficient lead-time is generally available to conduct a more detailed analysis of alternatives before the Action Memorandum is signed. The process by which alternatives are analyzed is described through the

Highlight 5 - SAMPLE LANGUAGE FOR THE EE/CA

Description of Alternatives:

This removal alternative will comply with the LDRs through a Treatability Variance under 40 CFR 268.44. This Variance will result in the use of [specify technology] to attain the Agency's interim "treatment levels/ranges" for the contaminated soil at the site.

Evaluation of Alternatives:

The LDRs are applicable and can be practicably met for [Enter number] of [Enter total number of alternatives] removal alternatives being considered. [Enter number] of the [Enter total number of alternatives] alternatives would comply with the LDRs through a Treatability Variance.

steps of the Engineering Evaluation/Cost Analysis (EE/CA) process. Sample language for the EE/CA is provided in **Highlight 5**. The EE/CA process includes gathering information that will aid in determining whether an LDR requirement is applicable and selecting a recommended action. The EE/CA process is similar to the RI/FS process and generally includes six steps:

- Site characterization;
- Identification of removal action objectives;
- Identification of removal action alternatives;
- Analysis of removal action alternatives;
- Comparative analysis of removal action alternatives; and
- Recommendation of removal action alternative.

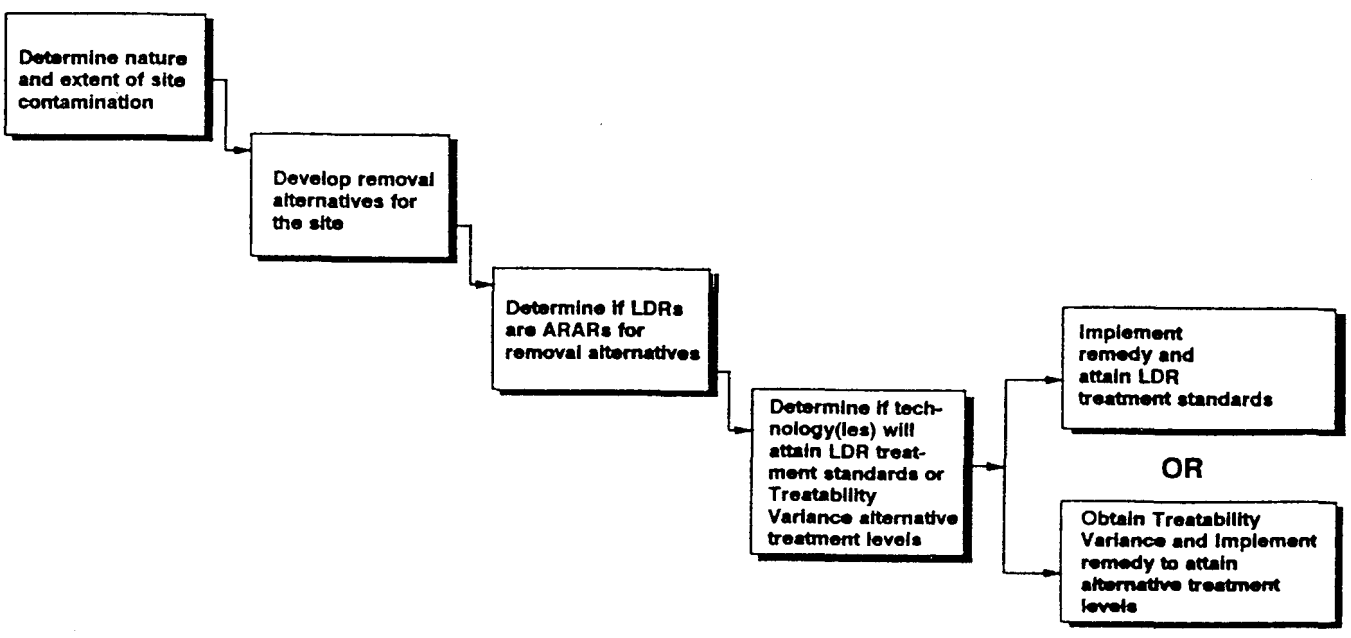
For non-time-critical removals, the information to justify a Treatability Variance should be included in a memorandum attached to the EE/CA. Public comments on the Treatability Variance should be solicited for a period of at least 30 days when the EE/CA is made available, in accordance with the administrative record requirements in the NCP (40 CFR 300.820).

SUMMARY

Because of the important role the LDRs may play in Superfund removals, OSCs need to incorporate early in the removal process the necessary investigative and analytical procedures to determine if the LDRs are ARARs for on-site removal alternatives that involve the "placement" of wastes, and if compliance with the LDRs is practicable. When the LDRs are ARARs and compliance is practicable (or for off-site actions, when LDRs are applicable), OSCs should determine if treatment processes can attain either the LDR treatment standards or the alternate levels that would be established under a Treatability Variance.

Once removal alternatives are identified, OSCs should determine if alternatives involve placement of restricted RCRA wastes, and if so, identify the BDAT constituents requiring control. Next, OSCs should evaluate those alternatives that involve treatment and placement of restricted RCRA hazardous wastes to ensure the technology process(es) will attain the appropriate treatment levels (i.e., either the LDR treatment standard or Treatability Variance alternate treatment levels for restricted RCRA hazardous wastes), and, in accordance with Superfund goals, reductions of 90 percent or greater for Superfund primary contaminants of concern). If a Treatability Variance is necessary, a request for a Variance must be made in the Action Memorandum (or in an amendment to the Action Memorandum) and EE/CA Report, and public comment solicited. The results of these evaluations are also documented in the Action Memorandum and EE/CA Report. The integration of the LDRs into the removal actions is illustrated in **Highlight 6**. An example of the process for complying with a Treatability Variance for contaminated soil and debris is presented in **Highlight 7**.

Highlight 6: LDRs IN THE REMOVAL PROCESS



Highlight 7: IDENTIFICATION OF TREATMENT LEVELS FOR A TREATABILITY VARIANCE

As part of the removal investigation, it has been determined that soils in one location at a site contain F006 wastes and cresols (which site records indicate were an F004 waste). Arsenic, which was determined to be a characteristic RCRA hazardous waste, also was found in soils at a separate location. Cadmium, chromium, lead, and arsenic were identified as contaminants found in the highest concentrations. The concentration range of all of the constituents found at the site included:

Constituent	Total Concentration (mg/kg)	TCLP (mg/l)	Constituent	Total Concentration (mg/kg)	TCLP (mg/l)
Cadmium	2,270 - 16,200	120 - 146	Nickel	100 - 140	1 - 6.5
Chromium	3,160 - 4,390	30 - 56	Silver	1 - 3	—
Cyanides	80 - 150	1 - 16	Cresols	50 - 600	.25 - 4
Lead	500 - 625	2 - 12.5	Arsenic	800 - 1,900	3 - 9

Four remedial alternatives are being considered: (1) Low temperature thermal stripping of soil contaminated with cresols followed by immobilization of the ash; (2) Immobilization of the soil in a mobile unit; (3) In-situ immobilization; and (4) Capping of wastes. Each of these alternatives must be evaluated to determine if they will result in significant reduction of the toxicity, mobility, or volume of the waste; whether "placement" occurs; and, if "placement" occurs, whether the treatment will attain the alternative treatment levels established through a Treatability Variance for the BDAT constituents requiring control.

STEP 1: IDENTIFY THE RESTRICTED CONSTITUENTS

- Because F006 and F004 wastes have been identified in soils at the site, the Superfund site manager must meet alternate treatment levels established through a Treatability Variance for the BDAT constituents. These constituents are: **Cadmium, Chromium, Lead, Nickel, Silver,** and **Cyanide** for F006 and **Cresols** for F004.

AND DIVIDE THE CONSTITUENTS INTO THEIR STRUCTURAL/FUNCTIONAL GROUPS (see **Highlight 2**):

- All of the F006 constituents are in the **Inorganics** structural/functional group.
- Cresols are in the **Other Polar Organic Compounds** structural/functional group.
- The action should result in the effective reduction (i.e., at least 90 percent) of all primary constituents of concern (i.e., **Cadmium, Chromium, Lead, and Arsenic**).

STEP 2: COMPARE THE CONCENTRATION THRESHOLD FOUND IN HIGHLIGHT 2 TO THE CONCENTRATIONS FOUND AT THE SITE AND CHOOSE EITHER THE CONCENTRATION LEVEL RANGE OR PERCENT REDUCTION RANGE FOR EACH RESTRICTED CONSTITUENT.

Constituent	Site Concentration	Threshold Concentration	Appropriate Range: Concentration	Appropriate Range: Percent Reduction	Range to be achieved (compliance analysis)
Cadmium	120 - 146 ppm	> 40 ppm		X	95-99.9 Percent Reduction (TCLP)
Chromium	30 - 56 ppm	< 120 ppm	X		0.5 - 6 ppm (TCLP)
Lead	2 - 12.5 ppm	< 300 ppm	X		0.1 - 3 ppm (TCLP)
Nickel	1 - 6.5 ppm	< 20 ppm	X		0.5 - 1 ppm (TCLP)
Cresols	50 - 600 ppm	> 100 ppm	X		90-99 Percent Reduction (TCLP)
Cresols (TCLP)	.25 - 4 ppm			X	
Arsenic	3 - 9 ppm	< 10 ppm	X		0.27 - 1 ppm (TCLP)

STEP 3: IDENTIFY TREATMENT TECHNOLOGIES THAT MEET THE TREATMENT RANGES.

- **Highlight 2** lists the technologies that achieved the alternate treatment levels for each structural/functional group.
- Because cresols are present in relatively low concentrations (assumed for the purposes of this example), a TCLP may be used to determine if immobilization results in a sufficient reduction of mobility of this restricted RCRA hazardous waste. (Measures to address any volatilization of organics during immobilization processes will be necessary.)
- Immobilization also will result in the effective reduction in leachability (i.e., at least 90 percent) of arsenic, a Superfund primary contaminant of concern.

Alternative	Effective Reduction of Toxicity, Mobility, Volume?	"Placement?"	Meet Treatability Variance Alternate Levels?
1. Low temperature stripping/ Immobilization	Yes	Yes	Yes
2. Immobilization in mobile unit	Yes	Yes	Yes
3. In-situ immobilization	Yes (Mobility)	No (LDRs not ARARs)	—

STEP 4: PREPARE ACTION MEMORANDUM OR EE/CE REPORT

- **Highlight 4** provides sample language for the Action Memorandum and **Highlight 5** provides the sample language for the EE/CA to present the intent to comply with the LDRs through a Treatability Variance.

Superfund LDR Guide #7
Determining When Land Disposal Restrictions are Relevant and Appropriate to CERCLA Response Actions

29

United States Environmental Protection Agency

Office of Solid Waste and Emergency Response

Superfund Publication: 9347.3-08FS December 1989

EPA

Superfund LDR Guide #7

Determining When Land Disposal Restrictions (LDRs) Are Relevant and Appropriate to CERCLA Response Actions

CERCLA Section 121(d)(2) specifies that on-site Superfund remedial actions shall attain "other Federal standards, requirements, criteria, limitations, or more stringent State requirements that are determined to be legally applicable or relevant and appropriate (ARAR) to the specified circumstances at the site." In addition, the National Contingency Plan (NCP) requires that on-site removal actions attain ARARs to the extent practicable. Off-site removal and remedial actions must comply with legally applicable requirements. **This guide outlines the process used to determine whether the Resource Conservation and Recovery Act (RCRA) land disposal restrictions (LDRs) established under the Hazardous and Solid Waste Amendments (HSWA) are "relevant and appropriate" to an on-site CERCLA response action.** (See Superfund LDR Guide #5 for determining when LDRs are applicable to CERCLA response actions.) The guide also provides examples of when the LDRs are likely to be relevant and appropriate and when they are not. With respect to contaminated soil and debris, EPA is undertaking a rulemaking to establish specific LDRs; until this rulemaking is completed, EPA generally will not consider the LDRs to be relevant and appropriate for soil and debris contaminated with hazardous substances that are not RCRA restricted wastes. More detailed guidance on Superfund compliance with the LDRs is being prepared by the Office of Solid Waste and Emergency Response (OSWER).

LDR RELEVANT AND APPROPRIATE DETERMINATIONS

For on-site CERCLA responses that constitute placement, and for which the LDRs have been determined not to be applicable (i.e., the wastes being placed are not prohibited or restricted RCRA wastes), site managers should evaluate whether the LDRs are relevant and appropriate. As discussed in the CERCLA Compliance with Other Laws Manual (EPA, August 8, 1988), relevant and appropriate decisions require best professional judgment of site-specific factors to determine whether a requirement addresses problems or situations sufficiently similar to the circumstances of the release, or remedial action contemplated, and is well-suited to the site, and therefore, is both relevant and appropriate.

Section 300.400(g)(2) of the proposed NCP [53 FR at 51436 (December 21, 1988)] outlines a number of factors pertaining to CERCLA situations and potential ARARs which should be compared to determine whether a requirement is both relevant and appropriate. The four pertinent factors to compare when evaluating the potential relevance and appropriateness of the LDRs are: (1) the action or activities regulated by the requirement (e.g., placement on the land) and the remedial action contemplated; (2) the purpose of the requirement and the purpose of the CERCLA action; (3) the substances regulated by the requirement and the substances found at the CERCLA site; and (4) the medium regulated or affected by the requirement and the medium contaminated or affected at the CERCLA site. These factors are evaluated to determine **whether the circumstances of the release and remedial action contemplated are such that use of the LDR requirements is well-suited to CERCLA response objectives.**

The evaluation of the circumstances of a release is conducted as part of the remedial investigation, during which information is collected on contaminant sources, potential routes of migration, and potential human and environmental receptors of concern. The results of this effort (which is ultimately documented in the site characterization and baseline risk assessment chapters of the RI/FS report) are used to establish remedial action objectives for the areas or media contaminated at the site that pose a threat to human health and the environment. The site-specific CERCLA response objectives of the remedial action contemplated should be compared with the purpose or objectives of the LDRs as a first step in determining the potential relevance and appropriateness of the LDRs [proposed NCP factors (a) and (e)].

The objective of the LDRs is to achieve reductions in the toxicity and/or mobility of a

hazardous waste, based on application of the best demonstrated available technology (BDAT), prior to its land disposal. While this objective will often be compatible with remedial alternatives designed to destroy highly concentrated, toxic, and mobile materials such as liquids, other remedial alternatives involving treatment of the principal threats of a site may have different objectives to which the LDRs are not well-suited.

Once a decision is made that achieving BDAT reductions in the toxicity and/or mobility of a waste source is compatible with CERCLA response objectives for the site, site managers should utilize information on waste constituents and matrices collected as part of the site characterization to evaluate whether a CERCLA waste is "sufficiently similar" to a listed RCRA waste code or family of waste codes (e.g., K048-K052, petroleum refining wastes) such that the LDR standard for that waste code is appropriate for the CERCLA waste.

In determining whether a CERCLA waste is sufficiently similar, site managers should consider whether the BDAT used to set the LDR standard would be effective for the CERCLA waste. (Technologies other than those used to set the BDAT standards may be considered, although they must be regarded as capable of meeting the promulgated concentration requirements.) Although **a constituent-by-constituent analysis is not necessary for relevant and appropriate determinations**, a general comparison of the waste constituents and matrices is useful for identifying waste codes to which a CERCLA waste may be similar, and therefore, helpful in the identification of technologies that may be appropriate for consideration.

If a CERCLA waste that consists of a complex mixture of several different wastes occurs in a different medium (e.g., soil) or matrix (BDAT standards may be established for specified matrices, such as wastewaters, nonwastewaters, or both) from what is specified for a particular restricted waste code or contains incompatible waste constituents, use of BDAT may not be appropriate for that waste, and therefore, the LDRs would not be relevant and appropriate [proposed NCP factor (b)]. It has been the experience of the Superfund program that Treatability Variances are frequently necessary for soil and debris contaminated with a restricted RCRA waste (see Superfund LDR Guide #6A), because the promulgated LDR standards are based on treating less complex matrices of industrial process wastes. As a logical corollary to this finding, the Agency believes that LDRs generally would not be "relevant and appropriate" requirements for soil and debris contaminated with non-RCRA restricted wastes. However, the Agency plans to undertake a rulemaking that will prescribe applicable standards for the treatment of soil and debris contaminated with RCRA-restricted wastes. In the future, these standards may be relevant and appropriate to the treatment of soil and debris contaminated with non-restricted wastes.

> **NOTE:** If the LDRs are determined to be relevant and appropriate requirements for a CERCLA action (i.e., there is a close match between the CERCLA and LDR objectives, and a close match between the constituents/matrix of the CERCLA waste and the constituents/matrix of the relevant RCRA waste code), but the treatment process involved in the remedy does not achieve BDAT levels in the field as anticipated, a Treatability Variance establishing alternate treatment levels should be sought.

Examples illustrating the relevant and appropriate determination process follow:

- A number of drums containing hazardous wastes are discovered during a site investigation. Although no written documentation or specific knowledge of the source is available to identify with certainty the origins of the wastes, the laboratory analyses indicate that they contain very high concentrations of a predominantly liquid waste indicative of industrial waste streams. Therefore, maximum destruction of the drum contents is established as the remedial action objective. Due to the general similarity of the bulk liquids to the spent solvents listed in the F001-F005 waste codes, the CERCLA site manager determines that use of incineration (one of the BDAT identified in the solvent and dioxin rule for that family of waste codes) would be technically suitable. Therefore, the LDRs would be relevant and appropriate for an alternative involving the treatment and placement of the drummed waste.

- A CERCLA waste mixture from an unknown source is found to consist of wastes similar to F021 dioxin-containing wastes (i.e., they contain constituents found in dioxin-containing wastes) and mercury. Because use of incineration -- the BDAT for dioxin-containing wastes -- would not be compatible with a waste also containing mercury, application of the LDR treatment standards to this waste mixture would not be appropriate. Therefore, the LDRs would not be relevant and appropriate to a CERCLA response involving the placement of this waste mixture. (Alternate methods of treating the waste might still be necessary to satisfy both the CERCLA statutory requirement to utilize treatment to the maximum extent practicable and the program expectations that are outlined in the proposed NCP.)

Superfund LDR Guide #8
Compliance with Third Third Requirements Under Land Disposal Restrictions

30

United States Environmental Protection Agency
Office of Solid Waste and Emergency Response
Superfund Publication: 9347.3-08FS
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EPA

Superfund LDR Guide #8

Compliance with Third Third Requirements under the LDRs

Office of Emergency and Remedial Response
Hazardous Site Control Division 0S-220

Quick Reference Fact Sheet

The 1984 Hazardous and Solid Waste Amendments (HSWA) require EPA to promulgate regulations restricting the land disposal of RCRA hazardous wastes. EPA previously promulgated regulations restricting the land disposal of solvent- and dioxin-containing, California list, First Third, and Second Third wastes. **This guide** (the eighth in a series of LDR guides prepared by the Office of Emergency and Remedial Response (OERR)) **summarizes the key provisions of the Third Third LDR rule and discusses potential implications for CERCLA response actions.** More detailed guidance on Superfund compliance with the LDRs is being prepared by the Office of Solid Waste and Emergency Response (OSWER).

The Third Third rule, promulgated on May 8, 1990, restricts all remaining RCRA hazardous wastes (listed as of November 8, 1984) for which treatment standards had not previously been set. Wastes for which LDR standards are not established include certain wastes that were newly listed or newly identified after November 8, 1984, mineral processing wastes previously excluded from regulation under the Bevill Amendment, and certain newly identified characteristic wastes. The rule sets treatment standards and effective dates for the characteristic hazardous wastes, First and Second Third wastes that were "soft hammered," multi-source leachate, and mixed hazardous and radioactive wastes. EPA granted a 90-day national capacity variance for all wastes in the Third Third rule, excluding those wastes already receiving a two-year national capacity variance. In addition, EPA provided important policy guidance on the following issues:

- Continued application of the California list restrictions;
- Interpretation of the dilution prohibition; and
- Application of LDR standards to lab packs.

TREATMENT STANDARDS

As with previous LDR rules, EPA set concentration-based treatment standards for Third Third wastes whenever possible (thus allowing use of any technology that can achieve the specified performance level). However, many Third Third treatment standards are set as methods of treatment (e.g., incineration), because the Agency currently has no means of calculating valid concentration-based standards that can be used for compliance monitoring. To comply with the LDRs when EPA has specified a method(s) of treatment, site managers must either use the specified technology to treat the waste or demonstrate that an alternative technology can achieve a level of performance equivalent to that of the specified technology.

In cases where soil and debris are contaminated with RCRA hazardous wastes for which the treatment standards are methods of treatment, site managers should continue to comply with the LDRs through a Treatability Variance, as outlined in Superfund LDR Guides #6A and #6B. [See Preamble to the 1990 National Contingency Plan (NCP), 55 FR 8760-61, March 8, 1990.]

NATIONAL CAPACITY VARIANCES

EPA granted a 90-day national capacity variance, until August 8, 1990, for all wastes included in the Third Third Rule. EPA also granted certain wastes national capacity variances from the LDRs for up to two years (from May 8, 1990 until May 8, 1992), based on inadequate treatment capacity. The surface-disposed wastes receiving a two-year national capacity variance are listed in **Highlight 1**.

CHARACTERISTIC WASTES

Among the wastes restricted in the Third Third rule are those wastes exhibiting one or more of the RCRA hazardous characteristics (i.e., ignitability, corrosivity, reactivity, or toxicity). EPA set treatment standards for the characteristic wastes both as concentration-based levels and methods of treatment. For most characteristic wastes with concentration-based treatment levels, EPA generally set the LDR treatment standards at the characteristic level that defines these wastes as hazardous. For example, EPA currently defines a D009 waste as mercury that leaches more than 0.2 mg/l using the EP toxicity test; the treatment standard for mercury is 0.2 mg/l using the TCLP test. Because EPA established concentration levels for these wastes at the characteristic level, treatment to the LDR treatment standards will render the treated wastes non-hazardous. Therefore, the treated wastes may be disposed of in Subtitle D landfills. [Note: the Agency recently promulgated the toxicity characteristic (TC) rule, which requires use of the TCLP test beginning September 25, 1990 as a means of determining whether a waste is characteristic. Therefore, as of September 25, 1990, the TCLP will be used to determine whether a waste is characteristic and, in most cases, for compliance with LDR standards prior to disposal.]

Highlight 1 - SURFACE-DISPOSED WASTES RECEIVING TWO-YEAR NATIONAL CAPACITY VARIANCES IN THE THIRD THIRD RULE

Technology	Waste Code[a]	
All	All scheduled mixed hazardous/radioactive wastes and D004-D011 inorganic solid debris	
Vitrification	D004 K031 K084 K101 K102 P010	P011 P012 P036 P038 U136
Combustion of Sludge/Solids	F039[b]	K048-K052[c]
Acid Leaching and Chemical Precipitation (low mercury) and mercury retorting (high mercury)	D009 K106 P065	P092 U151
Secondary Smelting	D008[d]	
Thermal Recovery	P087 (wastewater and nonwastewater)	
Incineration, vitrification, and mercury retorting	Soil and Debris	

[a] Variances are granted only to the nonwastewater forms, unless otherwise noted.
[b] Multi-source leachate.
[c] Capacity extension only until November 8, 1990.
[d] D008 lead-acid batteries.

For the pesticide wastewaters, EPA set treatment standards as specified technologies. For pesticide nonwastewaters, the treatment standards are set as total waste concentrations (not extract concentrations). Although these total waste concentrations appear to be higher than the levels that define the wastes as hazardous, given the 20 to 1 dilution factor inherent in the TCLP and EP protocols, no correlation between the treatment standard and the characteristic level can be assumed. Therefore, testing likely will be necessary to determine whether these wastes remain hazardous once treated to the LDR treatment standards (see **Highlight 2**).

For characteristic wastes with specified methods of treatment (e.g., certain D001 ignitable wastes), site managers must treat the wastes with the specified technology or demonstrate that an alternative technology can achieve an equivalent level of performance. Following treatment, wastes should be tested to determine whether the wastes have been rendered non-hazardous and evaluated as to whether the residues exhibit characteristics other than those for which the waste was originally treated. In some cases, the use of a BDAT treatment technology to remove one characteristic

Highlight 2 - THIRD THIRD CHARACTERISTIC PESTICIDE NONWASTEWATER TREATMENT STANDARDS

Waste	Name	LDR Treatment Standard (mg/l) (total waste)	EP Toxicity/TC Level (mg/l)*
D012	Endrin	0.13	0.02
D013	Lindane	0.066	0.4
D014	Methoxychlor	0.18	10.0
D015	Toxaphene	1.3	0.5
D016	2,4-D	10.0	10.0
D017	2,4,5-TP	7.9	1.0

* These also will be the regulatory standards under the TCLP when it becomes effective on September 25, 1990.

could result in a residue that exhibits a different characteristic and, therefore, the residue may require further treatment. For example, incineration of an ignitable D001 waste may generate an ash that exhibits the characteristic of toxicity for certain metals. This ash would need to be treated for the additional characteristic to meet the LDR treatment standard before disposal. If the treatment has rendered the waste non-hazardous, the residues may be disposed of in a Subtitle D facility.

When a listed waste also exhibits a characteristic, the waste must be treated to the treatment standard established for both the listed waste and its characteristic, unless the characteristic constituent or property is specifically addressed through the treatment standard for the listed waste. For example, if F006 waste (for which lead is a BDAT constituent) also exhibits the hazardous characteristic of lead, the waste must be treated only to the treatment standard for F006, because it is the most waste-code specific standard and lead is a constituent directly addressed by the F006 treatment standard. If an F001 solvent waste also exhibits the characteristic of lead, however, the waste must be treated to meet the F001 solvent standard and the D008 lead treatment standard, because lead is not a BDAT constituent for F001 waste. Therefore, it is important for site managers to determine all of the listed and characteristic codes that may apply to a waste.

Because EPA divided several of the characteristic wastes into treatability groups for purposes of establishing treatment standards, (see **Highlight 3**), site managers should determine which treatability group(s) are present during a response action and comply with their respective treatment standards.

MULTI-SOURCE LEACHATE

EPA has listed multi-source leachate, defined as leachate derived from the treatment, storage, disposal, or recovery of more than one listed hazardous waste, as a new waste code, F039, and established one set of wastewater standards and one

set of nonwastewater standards for this code. These standards set concentration levels for the entire BDAT list of constituents (approximately 200 in total) that may be found in multi-source leachate (see **Highlight 4**). [Note: treatment standards for the constituents under F039 may differ from standards for the same constituents in other more specific waste codes.]

CERCLA compliance with the F039 treatment standards will involve the analysis of the BDAT constituents present in waste streams extracted through leachate collection systems, and the treatment of such wastes to meet the appropriate levels for these constituents. Because of the RCRA derived-from rule, residuals from the treatment of multi-source leachate are restricted under the LDRs. [Note: Leachate derived from the exclusive management of more than one of the listed dioxin-containing hazardous wastes (e.g., F020-F023 and F026-F028) is classified as a single-source dioxin waste and is not considered multi-source leachate.]

MIXED RADIOACTIVE WASTES

EPA promulgated treatment standards expressed as specified methods for the following four categories of mixed hazardous and radioactive wastes: (1) hydraulic oils contaminated with mercury, (2) wastes containing elemental mercury, (3) wastes containing elemental lead, and (4) D002, D004-D011 radioactive high-level wastes generated during reprocessing of fuel rods. For other mixed wastes, the treatment standard for the RCRA hazardous waste code is the standard in effect for the hazardous portion of mixed wastes. EPA determined that inadequate nationwide treatment capacity exists for all Third Third surface-disposed mixed radioactive wastes, and granted these wastes a two-year national capacity variance. Mixed wastes containing only spent solvents and dioxins, or California list wastes, are still subject to the applicable treatment standards; no capacity variances are in effect for these wastes.

Highlight 3 - SUBCATEGORIES FOR CHARACTERISTIC WASTES

The following are RCRA characteristic wastes for which EPA established treatability groups in addition to wastewaters and nonwastewaters:

- D001 Ignitables
  - Ignitable liquids
    - -- organic liquids
    - -- aqueous liquids
    - -- wastewaters
  - Ignitable reactives
  - Oxidizers
  - Ignitable compressed gases
- D002 Corrosives
  - Acids
  - Alkalines
  - Other corrosives
- D003 Reactives
  - Reactive cyanides
  - Explosives
  - Water reactives
  - Reactive sulfides
  - Other reactives
- D006 Cadmium
  - Wastewaters
  - Nonwastewaters
  - Cadmium Batteries
- D007 Chromium
  - Wastewaters
  - Nonwastewaters
  - Chromium Bricks
  - Chromium Batteries
- D008 Lead
  - Wastewaters
  - Nonwastewaters
  - Lead-Acid Batteries

Note: Those characteristic wastes not listed here have wastewater and nonwastewater categories treatability groups only.

Highlight 4 - EXAMPLE OF F039 MULTI-SOURCE LEACHATE TREATMENT STANDARD*
(Standards are set in a similar manner for each of the approximately 200 BDAT constituents.)

Wastewater	Total Concentration+ (mg/l)
Acetone	0.28
Acenaphthalene	0.059
Acenaphthene	0.059
Acetonitrile	0.17
Acetophenone	0.010
•	
•	
•	

Nonwastewater	Total Concentration++ (mg/kg)
Acetone	160.0
Acenaphthalene	3.4
Acenaphthene	9.1
Acetophenone	9.6
•	
•	
•	

Notes:
* F039 nonwastewaters received two year national capacity variances.

+ Total concentration for wastewaters based on the maximum for any single grab sample

++ Total composition for nonwastewaters based on maximum for any 24-hour composite.

CALIFORNIA LIST WASTES

On July 8, 1987, EPA promulgated a final rule establishing treatment standards for California list wastes containing PCBs and certain HOCs, and codified the statutory prohibition on liquid corrosive wastes. The statutory prohibition is in effect for the California list wastes containing free cyanides, metals, and the California list dilute HOC wastewaters. As discussed in Superfund LDR Guide #2, *Complying With the California List Restrictions Under the Land Disposal Restrictions (LDRs)*, when the California list waste restrictions overlap with waste-code specific treatment standards, the waste-code specific treatment standards apply. Therefore, most California list prohibitions are now superseded by more waste-code specific prohibitions and treatment standards as a result of the Third

Third rule. However, the California list prohibitions will continue to apply in the cases outlined below:

- Liquid hazardous wastes that contain over 50 ppm PCBs, where the PCBs are not regulated by the treatment standard;
- HOC-containing wastes that are identified as hazardous by a characteristic property not involving HOCs, such as an ignitable waste that also contains greater than 1,000 ppm HOCs;
- Liquid hazardous wastes that contain a total concentration equal to or greater than 134 mg/l of nickel and/or 130 mg/l of thallium (because these two constituents are not regulated under the characteristic of toxicity); and
- Wastes with a national capacity variance that are also California list wastes, until the waste-code specific treatment standards become effective.

LAB PACKS

In the Second Third rule, EPA reaffirmed that all restricted wastes in lab packs being land disposed must comply with the LDR treatment standards for each waste in the lab pack. In the Third Third rule, EPA established two alternate treatment standards for lab packs: (1) incineration followed by treatment (e.g., stabilization) to meet the appropriate individual treatment standard for each EP toxic metal present in lab packs containing **only organo-metallic wastes** (listed in 40 CFR 268 Appendix IV); and (2) incineration as a method for lab packs that contain **only certain organic wastes** (listed in 40 CFR 268 Appendix V).

Where possible, site managers should segregate lab packs containing wastes found in 40 CFR 268 Appendix IV and V to facilitate appropriate treatment determination. Lab packs that contain PCBs or dioxins must continue to meet the treatment standards for those wastes. For example, a lab pack containing only dioxin-containing wastes (F020-F023 and F026-F028), a mixture of dioxin-containing wastes and organic hazardous wastes, or California list PCBs and dioxin-containing wastes must be incinerated according to the applicable standards for those wastes.

DILUTION PROHIBITION

In the Third Third rule, EPA reaffirmed the existing dilution prohibition contained in 40 CFR 268.3 for RCRA listed wastes, which restricts dilution through mixing of hazardous wastes unless such dilution meets the standard in § 3004(m) of substantially reducing the prohibited waste's toxicity or mobility. EPA has clarified, however, that the aggregation of wastes does not constitute impermissible dilution if the wastes are all legitimately amenable to the type of treatment being used. Dilution also is allowed in the following cases for characteristic wastes:

- When characteristic wastes are managed in wastewater treatment systems discharging under the pretreatment program or an NPDES permit regulated under the Clean Water Act (CWA) (unless a method is specified), or disposing in Class 1 underground injection wells regulated under the Safe Drinking Water Act (SDWA), if nonhazardous at the point of injection.
- When dilution removes the characteristic property from non-toxic characteristic wastes. [EPA considers high total organic carbon (TOC) ignitable nonwastewaters, reactive cyanide wastes, reactive sulfide wastes, and EP toxic metals and pesticides to be toxic characteristic wastes, and dilution is not allowed for these wastes. All other D001-D003 wastes are considered non-toxic.]

Site managers should ensure that any dilution occurring as a result of waste streams being combined is for acceptable purposes (e.g., pretreatment or treatment). The dilution prohibition may be violated when wastes that are not amenable to the same type of treatment are aggregated. For example, if a listed hazardous waste containing metals is aggregated with organic wastewaters resulting in metal levels no longer exhibiting the characteristic, and the aggregated mixture is sent to biological treatment, the dilution prohibition would be violated because biological treatment is not an appropriate treatment for metal-bearing toxic wastes, (i.e., the metal removal was not as a result of treatment, but was from dilution).

NOTICE: The policies set out in this memorandum are intended solely as guidance. They are not intended, nor can they be relied upon, to create any rights enforceable by any party in litigation with the United States. EPA officials may decide to follow the guidance provided in this memorandum, or to act at variance with the guidance, based on an analysis of specific site circumstances. The Agency also reserves the right to change this guidance at any time without public notice.

ARARs Q's and A's:
Compliance with Toxicity Characteristics
Part I

31

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ARARs Q's & A's

Compliance With the Toxicity Characteristics Rule: Part I

Office of Emergency and Remedial Response
Office of Program Management OS-240
Quick Reference Fact Sheet

Section 121(d) of CERCLA, as amended by the 1986 Superfund Amendments and Reauthorization Act (SARA), requires that on-site remedial actions must at least attain (or justify a waiver of) Federal and more stringent State applicable and relevant and appropriate requirements (ARARs) upon completion of the remedial action. The 1990 National Contingency Plan (NCP) requires compliance with ARARs during remedial actions as well as at completion, and compels attainment of ARARs during removal actions, whenever practicable. See NCP, 55 FR 8666, 8843 (March 8, 1990) (to be codified at 40 CFR section 300.415(i)(1990)), and 55 FR 8666, 8852 (March 8, 1990) (to be codified at 40 CFR section 300.435(b)(2)(1990)).

To implement the ARARs provision, EPA has developed guidance, CERCLA Compliance With Other Laws Manual: Parts I and II (Publications 9234.1-01 and 9234.1-02), and has provided training to Regions and States on the identification of and compliance with ARARs. This "ARARs Q's and A's" is part of a series that provide guidance on a number of questions that arose in developing ARAR policies, in ARAR training sessions, and in identifying and complying with ARARs at specific sites. This particular Q's and A's Fact Sheet addresses compliance with the recently promulgated Toxicity Characteristics Rule (55 FR 11798 (March 29, 1990)).

Q1. How are wastes characterized as hazardous under RCRA?

A. RCRA Subtitle C requirements are applicable to CERCLA response actions if the waste is a RCRA hazardous waste, and either the waste was initially treated, stored, or disposed of after the effective date of the particular RCRA requirement, or the activity at the CERCLA site constitutes treatment, storage, or disposal, as defined by RCRA. RCRA uses the following two procedures to define wastes as hazardous: (1) the listing procedure, which involves identifying specific industrial or process wastes that pose hazards to human health and the environment; and (2) the hazardous characteristics procedure, which involves identifying properties or "characteristics" that, if exhibited by any waste, indicate a potential hazard if the waste is not properly controlled. See 40 CFR section 261.3(a)(2). The new Toxicity Characteristics (TC) rule concerns one of four characteristics that indicate a potential hazard (the others are ignitability, reactivity, and corrosivity). A waste is a TC waste if any of the chemicals listed in **Highlights 1 or 2** are found in the leachate at concentrations equal to or greater than their regulatory levels.

Highlight 1: NEW CHEMICALS REGULATED UNDER THE TC RULE AND THEIR LEACHATE REGULATORY LEVELS

Benzene	0.50	mg/l
Carbon tetrachloride	0.50	mg/l
Chlordane	0.03	mg/l
Chlorobenzene	100.0	mg/l
Chloroform	6.0	mg/l
m-Cresol	200.0	mg/l
o-Cresol	200.0	mg/l
p-Cresol	200.0	mg/l
1,4-Dichlorobenzene	7.5	mg/l
1,2-Dichloroethane	0.50	mg/l
1,1-Dichloroethylene	0.70	mg/l
2,4-Dinitrotoluene	0.13	mg/l
Heptachlor (and its hydroxide)	0.008	mg/l
Hexachlor-1,3-butadiene	0.5	mg/l
Hexachlorobenzene	0.13	mg/l
Hexachloroethane	3.0	mg/l
Methyl ethyl ketone	200.0	mg/l
Nitrobenzene	2.0	mg/l
Pentachlorophenol	100.0	mg/l*
Pyridine	5.0	mg/l
Tetrachloroethylene	0.7	mg/l
Trichloroethylene	0.5	mg/l
2,4,5-Trichlorophenol	400.0	mg/l
2,4,6-Trichlorophenol	2.0	mg/l
Vinyl chloride	0.20	mg/l

* interim regulatory level

Q2. What are the major provisions of the new TC rule?

A. The final TC rule adds 25 organic chemicals to the list of waste constituents which, if present in waste at or above the regulatory levels set in the rule (see **Highlight 1**), make the waste a hazardous waste. These 25 chemicals have been added to the 8 metals and 6 pesticides on the existing list of TC waste constituents (see **Highlight 2**). The TC rule also announced that 13 additional chemicals may be added to the TC list after EPA establishes their regulatory levels. Finally, the new TC rule replaces the Extraction Procedures (EP) with another test for determining toxicity (for both the new and existing chemicals regulated for the characteristic of toxicity). The new test is called the Toxicity Characteristics Leaching Procedure (TCLP). The impetus behind the development of the TCLP was the need to identify those wastes that are likely to leach hazardous concentrations of organic compounds.

Note: To determine compliance with RCRA land disposal regulations, the EP is still available for wastes that are not considered wastewater (i.e., for soils and sludges that contain more than 1% total suspended solids) and that contain either any amount of lead, or arsenic when it is the primary hazardous constituent (i.e., the highest constituent concentration) in the waste (see section 3(e)(8) of the final RCRA Third Third Rule, unpublished at the time of this printing).

Highlight 2: CHEMICALS ALREADY REGULATED FOR TOXICITY CHARACTERISTICS AND THEIR LEACHATE REGULATORY LEVELS

Arsenic	5.0 mg/l
Barium	100.0 mg/l
Cadmium	1.0 mg/l
Chromium	5.0 mg/l
Endrin	0.02 mg/l
Lead	5.0 mg/l
Lindane	0.4 mg/l
Mercury	0.2 mg/l
Methoxychlor	10.0 mg/l
Selenium	1.0 mg/l
Silver	5.0 mg/l
Toxaphene	0.5 mg/l
2,4-Dichloro-phenoxycetic acid	10.0 mg/l
2,4,5-Trichloropheno-xypropionic acid	1.0 mg/l

Q3. How does the new TC rule affect the regulatory levels of the potential TC wastes already regulated?

A. The regulatory levels of the eight metals and six pesticides remain the same (see **Highlight 2** for their levels). These constituents must now be tested using the TCLP to determine whether they exceed their regulatory levels. It is important to note that the EP and the TCLP may produce different results; wastes not hazardous under the EP may be hazardous under the TCLP.

Q4. How does the TCLP differ in approach from the EP in identifying the toxicity characteristic?

A. The primary differences between the TCLP and the EP are: (1) the TCLP uses two leaching media where the medium is determined by the pH of the waste (there is no continual pH adjustment); (2) the TCLP requires the waste to be ground or milled (there is no structural integrity procedure); (3) the TCLP requires a shorter extraction time (18 hours for the TCLP versus 24 hours for the EP); and (4) the TCLP is easier to run and the test results are more easily reproduced.

Q5. What is the current status of the TC rule as a potential ARAR for the Superfund program?

A. The TC rule was promulgated on March 29, 1990. It became a potential ARAR for all decision documents (i.e., RODs and action memoranda) signed after that date. For actions carried out during the interim period prior to the effective date (i.e., September 25, 1990), the TC rule would not be applicable, but may be relevant and appropriate.

Q6. How will the TC rule affect Superfund Records of Decision (RODs) that have already been signed?

A. The NCP states that ARARs "freeze" at the time of ROD signature. See 55 FR 8666, 8757, March 8, 1990, (to be codified at 40 CFR 300.430(f)(1)(ii)(B)). TC requirements were promulgated on March 29, 1990, and thus would not be ARARs for RODs signed before that date. For such RODs, the TC requirements are newly promulgated requirements, and thus should be attained only when EPA determines that these requirements are ARARs, and that they must be met for the remedy to be protective. Newly promulgated or modified requirements like the TC rule will be considered during the 5-year review of the remedy, or sooner, if appropriate, to determine whether the remedy is still protective. Regions should review pre-TC rule RODs to ensure that any on-site disposition of wastes still meets the standard of protectiveness. (This issue will be discussed further in the

forthcoming TC implementation Fact Sheet.) If EPA determines during the remedy review that the TC requirements must be attained, a ROD amendment or Explanation of Significant Differences (ESD) should be issued. See 55 FR 8666, 8757 (March 8, 1990) (to be codified at 40 CFR 300.430(f)(1)(ii)(B)).

Q7. **What are some potential overall effects of the TC rule on the Superfund program?**

A. Wastes containing any of the newly-regulated chemical constituents in the TC rule may be subject to RCRA regulations based on the toxicity characteristic, regardless of the source of a particular waste or whether the waste is a RCRA listed waste. In addition, because the TC rule expands the list of potential TC wastes that need to be evaluated for the characteristic of toxicity, the amount of wastes considered to be RCRA hazardous wastes at a CERCLA site will potentially expand. Once a waste is considered to be a RCRA hazardous waste, other RCRA requirements may be applicable or relevant and appropriate, such as closure, minimum technology disposal restrictions, and the land disposal restrictions. In addition, remedial alternatives involving off-site shipment of TC wastes must involve Subtitle C facilities, rather than Subtitle D facilities.

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In the near future, OERR will issue another Fact Sheet that discusses technical issues that may arise during the implementation of the TC rule at Superfund sites. The TC implementation Fact Sheet will be Part II to this ARARs Q's & A's Fact Sheet on the TC rule.

CERCLA Compliance with RCRA Toxicity Characteristics Part II

32

United States Environmental Protection Agency
Office of Solid Waste and Emergency Response
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CERCLA Compliance with the RCRA Toxicity Characteristics (TC) Rule: Part II

Office of Emergency and Remedial Response
Hazardous Site Control Division 0S-220

Quick Reference Fact Sheet

CERCLA remedial actions must comply with the requirements of the Resource Conservation and Recovery Act (RCRA) when they are determined to be applicable or relevant and appropriate requirements (ARARs) unless a waiver is justified. For RCRA Subtitle C hazardous waste requirements to be applicable, the CERCLA response action must constitute either treatment, storage, transport, or disposal of a RCRA hazardous waste. Therefore, to make determinations about the applicability or relevance and appropriateness of RCRA requirements, site managers need to understand how to identify whether a CERCLA waste is a RCRA hazardous waste (including when a waste exhibits the newly promulgated toxicity characteristics (TC)). **The purpose of this guide, the second dealing with the TC rule (see *ARARs Qs & As, Compliance with the Toxicity Characteristics Rule: Part I*, May 1990, Publication 9234.2-08FS) is to provide a general framework for managing CERCLA wastes in accordance with the new requirements.**

In order to ensure that all CERCLA response actions comply with RCRA requirements that are applicable or relevant and appropriate (including removal actions when compliance is determined to be practicable), site managers need to know whether contamination at the Superfund site includes RCRA hazardous wastes (see **Highlight 1**). In determining the presence of RCRA wastes that are hazardous because they exhibit the characteristic of toxicity, site managers must take into account a new RCRA regulation, the Toxicity Characteristic (TC) rule, which EPA promulgated on March 29, 1990 and which takes effect on September 25, 1990.

THE TOXICITY CHARACTERISTIC RULE

The TC rule (55 FR 11798, March 29, 1990) requires use of the toxicity characteristic leaching procedure (TCLP) test in place of the extraction procedure (EP) test to determine whether wastes exhibit the characteristic of toxicity. As with the EP, site managers are not required to test their wastes to determine if they exhibit the toxicity characteristic; knowledge of the wastes may be sufficient to make this determination [40 CFR 261.10(a)(2)(ii)]. Specific knowledge of CERCLA wastes will not be available at many Superfund sites, however, so that testing may be necessary.

Highlight 1
TYPES OF RCRA HAZARDOUS WASTES

Listed Wastes: Wastes from specific processes or from specific or non-specific sources that EPA has "listed" as RCRA hazardous wastes. These wastes carry the waste codes "F, K, P or U." For example:

K015 Still bottoms from the production of benzyl chloride.

Characteristic Wastes. Wastes that exhibit any one of four hazardous characteristics (these wastes carry a "D" waste code):

- Ignitability
- Corrosivity
- Reactivity
- Toxicity

Note: A RCRA hazardous waste must first be a solid waste, which is defined by RCRA as any material that is disposed of (i.e., abandoned, recycled in certain ways, or considered inherently waste-like). Exclusions from the definition (e.g., domestic sewage sludge, household wastes) are listed in 40 CFR 261.4(a) and (b).

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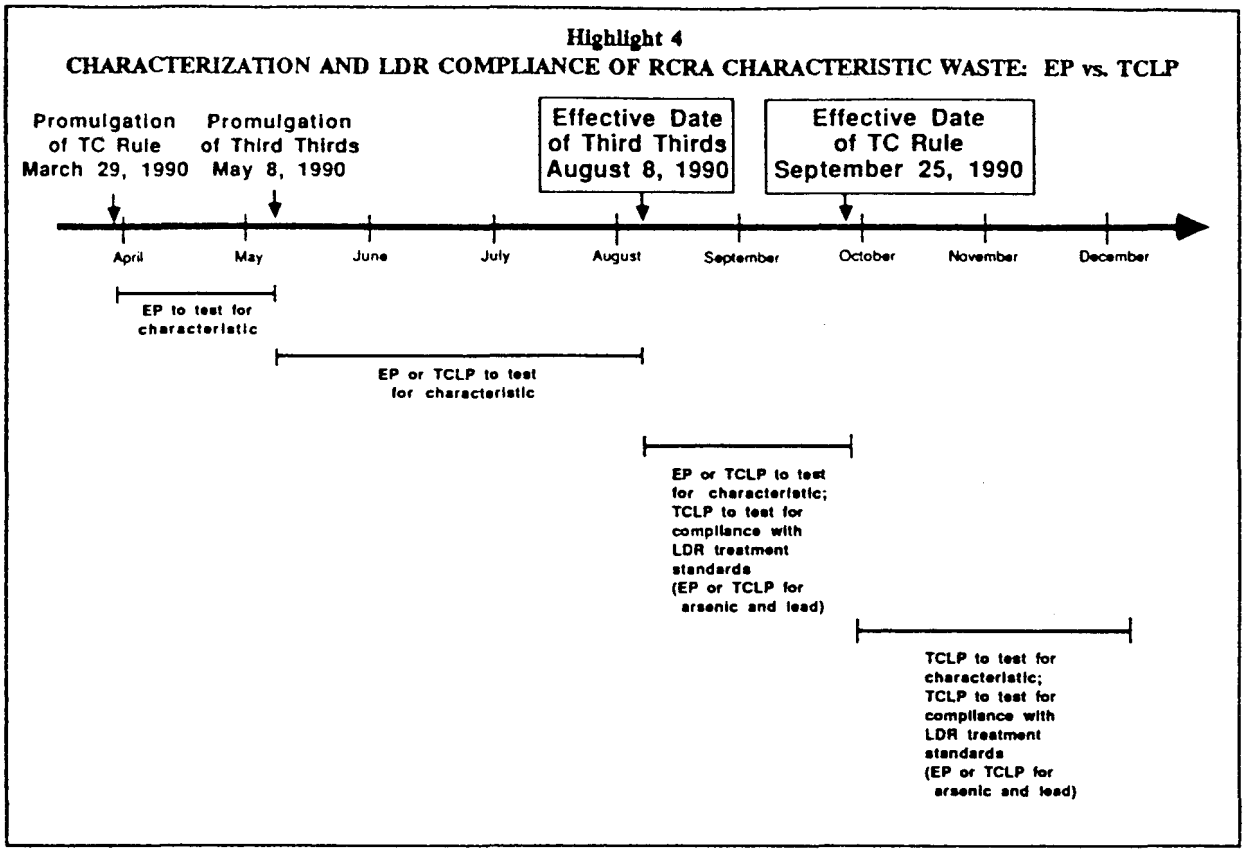

Pre-ROD

During an on-going RI/FS, or in cases where the investigation is complete but the ROD has not yet been signed, site managers should assess (either through use of the TCLP or knowledge of the waste, which could include EP test results) whether the wastes being managed are hazardous by toxicity characteristic and determine which, if any, RCRA Subtitle C requirements may be ARARs for each of the alternatives being considered.

Post-ROD

For RODs signed before March 29, 1990 that involve on-site disposal of waste, site managers do not have to run the TCLP to determine applicability of Subtitle C hazardous waste requirements because ARARs generally are considered to be "frozen" when a ROD is signed (although an assessment of the protectiveness of the remedy, in light of a new requirement, should be made). Because the TC rule simply addresses whether a waste is a characteristic RCRA hazardous waste, its consideration generally should not affect determinations made during the RI/FS and remedy selection process of the protectiveness of a remedy.

If an ongoing or planned response action (regardless of when the ROD was signed) involves or will involve off-site disposal of wastes after September 25, 1990, the wastes must be evaluated for the toxicity characteristic to ensure that applicable RCRA Subtitle C requirements are met at the time of disposal. For example, if wastes that exhibit the TC (but were not considered hazardous under the EP when tested earlier) are being disposed of in an off-site municipal Subtitle D landfill, these wastes can no longer be disposed of in this manner after September 25, 1990. These wastes will need to be disposed of in a RCRA Subtitle C facility or treated such that they are no longer characteristic prior to disposal in a Subtitle D facility. Depending on which of these options is chosen, a ROD amendment or explanation of significant differences (ESD) would need to be issued.

NOTICE: The policies set out in this memorandum are intended solely as guidance. They are not intended, nor can they be relied upon, to create any rights enforceable by any party in litigation with the United States. EPA officials may decide to follow the guidance provided in this memorandum, or to act at variance with the guidance, based on an analysis of specific site circumstances. The Agency also reserves the right to change this guidance at any time without public notice.

Constituents Regulated - The TC rule establishes regulatory levels for an additional 25 **organic chemicals** that were not previously regulated (D018-D043) and retains the regulatory levels for the 14 chemicals originally regulated under the old EP (i.e., D004-D017). Each of the constituents regulated and their regulatory levels (based on the TCLP) are shown in **Highlight 2.** Because the new chemicals regulated are organic constituents commonly found at Superfund sites, it is likely that more wastes at Superfund sites will exhibit the RCRA toxicity characteristic and will require management in accordance with RCRA Subtitle C hazardous waste requirements.

The results of the TCLP and EP tests generally are expected to be the same for the original 14 constituents (i.e., if a waste tested as non-characteristic under the EP test, it would not be expected to exhibit the characteristic under the TCLP test as well). However, in some cases, wastes that were not hazardous under the EP may be hazardous under the TCLP. Appropriate management and compliance options in such situations are discussed in the following section.

RELATIONSHIP OF TC TO OTHER RCRA REQUIREMENTS

- LDRs. As described in Superfund LDR Guide #8, *Compliance with Third Third Requirements under the LDRs*, the Third Third LDR rule promulgated on May 8, 1990, set LDR treatment standards for the 14 RCRA wastes that are identified as hazardous by characteristic using the EP toxicity test. (Note: compliance with the LDR standards for most characteristic wastes is based on the TCLP.) For the eight EP toxic metals (D004-D011), EPA generally set the LDR treatment standards as concentrations at the characteristic level, with the exception of selenium nonwastewaters, for which the treatment standard was set above the characteristic level, and certain high mercury nonwastewaters, for which a treatment technology of mercury retorting was set. For the pesticide wastewaters, a technology (e.g., incineration, biodegradation) was specified as the treatment standard. For pesticide nonwastewaters, the treatment standards were set as total waste concentrations (not extract

Highlight 2

CONSTITUENTS AND REGULATORY LEVELS ESTABLISHED UNDER THE TOXICITY CHARACTERISTIC RULE

Old EP Toxicity Constituents (now regulated under TC)

Waste Code	Regulated Constituent	Reg. Level (mg/l)
D004	Arsenic	5.0
D005	Barium	100.0
D006	Cadmium	1.0
D007	Chromium	5.0
D008	Lead	5.0
D009	Mercury	0.2
D010	Selenium	1.0
D011	Silver	5.0
D012	Endrin	0.02
D013	Lindane	0.4
D014	Methoxychlor	10.0
D015	Toxaphene	0.5
D016	2,4-D	10.0
D017	2,4,5-TP (silvex)	1.0

New TC Constituents

Waste Code	Regulated Constituent	Reg. Level (mg/l)
D018	Benzene	0.5
D019	Carbon tetrachloride	0.5
D020	Chlordane	0.03
D021	Chlorobenzene	100.0

New TC Constituents (cont.)

Waste Code	Regulated Constituent	Reg. Level (mg/l)
D022	Chloroform	6.0
D023	o-Cresol	200.0*
D024	m-Cresol	200.0*
D025	p-Cresol	200.0*
D026	Total cresols	200.0*
D027	1,4-Dichlorobenzene	7.5
D028	1,2-Dichloroethane	0.5
D029	1,1-Dichloroethylene	0.7
D030	2,4-Dinitrotoluene	0.13
D031	Heptachlor (and its epoxide)	0.008
D032	Hexachlorobenzene	0.13
D033	Hexachloro-1,3-butadiene	0.5
D034	Hexachloroethane	3.0
D035	Methyl ethyl ketone	200.0
D036	Nitrobenzene	2.0
D037	Pentachlorophenol	100.0
D038	Pyridine	5.0
D039	Tetrachloroethylene	0.7
D040	Trichloroethylene	0.5
D041	2,4,5-Trichlorophenol	400.0
D042	2,4,6-Trichlorophenol	2.0
D043	Vinyl chloride	0.2

* If o-, m-, and p-Cresol cannot be differentiated, total cresol concentration of 200.0 mg/l is used as the regulatory level.

concentrations). Although some of the total waste concentrations for these pesticide nonwastewaters appear to be higher than the levels that define the wastes as hazardous, when the 20 to 1 dilution factor inherent in the TCLP and EP protocols is considered, no certain relationship between the two standards can be stated, and, therefore, testing likely will be necessary to determine whether wastes treated to the LDR treatment standards remain hazardous.

The 25 new organic constituents are considered "newly identified" wastes, and will not be subject to the LDRs until the Agency promulgates treatment standards for those wastes. Furthermore, no other LDR restrictions (e.g., soft hammer requirements, California list restrictions) apply to these newly identified wastes; however, they must be disposed of in accordance with other RCRA Subtitle C requirements (i.e., in a regulated Subtitle C disposal unit).

Where wastes not hazardous under the EP test fail the TCLP test, these wastes also are considered RCRA "newly identified" wastes, and are not subject to LDR treatment standards. **Highlight 3** provides examples of how LDR requirements may apply to TC wastes.

- **Delisting**. Wastes that have been delisted may still be considered hazardous under RCRA if they exhibit the TC (or other) characteristic. Although this is not expected to occur, site managers who will be disposing of wastes or treatment residuals that have been delisted, or are in the process of being delisted, must nevertheless determine (either through testing or knowledge of the wastes) if their wastes exhibit the toxicity characteristic.

COMPLIANCE EVALUATIONS

As a result of the TC rule, site managers may need to evaluate whether wastes at a site exhibit the toxicity characteristic during the site investigation and implementation phases of a CERCLA response. **Highlight 4** contains a timeline outlining the legally acceptable options (established in the TC and Third Third rules) for using the EP and the TCLP to test for the characteristic of toxicity and compliance with LDR treatment standards.

Highlight 3
EXAMPLES OF LDR REQUIREMENTS FOR TC WASTES*

- A TC waste containing lead (D008) at 8.0 mg/l (based on leachate analysis) must be treated (e.g., by using immobilization) to comply with the LDR treatment standard of 5.0 mg/l before land disposal. Because the LDR treatment standard is also the characteristic level, the treated wastes would no longer be considered a RCRA hazardous waste and, therefore, disposal in a Subtitle D facility would be permissible.

- The LDRs are <u>not</u> in effect for a waste containing benzene (D018) at 6.0 mg/l (using a TCLP analysis) that will be land disposed because D018 is a newly identified waste for which no LDR standards exist. The waste must be disposed of as a Subtitle C RCRA hazardous waste (unless the waste is treated to below the TC level for benzene of 0.5 mg/l).

- Wastes containing a mixture of lead and benzene at concentrations above the TC levels must be treated to meet the LDR treatment standard for lead before disposal. If, after treatment, the waste still exhibits the characteristic for benzene, it must be managed as a RCRA hazardous waste. If treatment removes the characteristic for benzene, through immobilization or other treatment methods, the treated waste may be disposed of in a Subtitle D landfill.

NOTE: If any of the 14 original EP constituents for which standards are in effect are contained in soil and debris, site managers may want to obtain a Treatability Variance to comply with the LDRs. However, depending on the waste's original (or threshold) concentration, attaining the characteristic level may be a less stringent requirement than obtaining the alternate treatability variance level established in Superfund LDR Guides #6A and #6B.

* TC effective date is September 25, 1990.

CERCLA Compliance with Other Laws Manual, CERCLA Compliance with CWA and SDWA

33

United States Environmental Protection Agency

Office of Solid Waste and Emergency Response

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CERCLA Compliance With Other Laws Manual

CERCLA Compliance with the CWA and SDWA

Office of Emergency and Remedial Response
Office of Program Management OS-240

Quick Reference Fact Sheet

The 1986 Superfund Amendments and Reauthorization Act (SARA) adopts and expands a provision in the 1985 National Contingency Plan (NCP) that remedial actions must at least attain applicable or relevant and appropriate requirements (ARARs). Section 121(d) of CERCLA, as amended by SARA, requires attainment of Federal ARARs and of State ARARs in State environmental or facility siting laws when the State requirements are promulgated, more stringent than Federal laws, and identified by the State in a timely manner.

To implement the ARARs provision, EPA has developed guidance, CERCLA Compliance With Other Laws Manual: Parts I and II (Publications 9234.1-01 and 9234.1-02). EPA is preparing a series of short fact sheets that summarize these guidance documents. This Fact Sheet focuses on CERCLA compliance with the Clean Water Act and the Safe Drinking Water Act (Chapters 3 and 4, respectively, in Part I). In addition, it discusses other statutes with provisions relevant to surface water or drinking water, such as dredge-and-fill requirements. The material covered here is based on SARA and on policies in the final revised NCP.

I. Compliance With The Clean Water Act

A primary purpose of the Clean Water Act (CWA), also known as the Federal Water Pollution Control Act, is to restore and maintain the quality of surface waters. The CWA regulations that are most likely to be ARARs for Superfund actions are the requirements for: (1) surface-water quality; (2) direct discharges to surface waters; (3) indirect discharges to publicly-owned treatment works (POTWs); or (4) discharges of dredge-and-fill materials into surface waters (including wetlands). Pollutants are regulated under the CWA according to their category (see **Highlight 1**).

A. CWA DIRECT DISCHARGE REQUIREMENTS (NPDES)

The CWA controls the direct discharge of pollutants to surface waters through the National Pollutant Discharge Elimination System (NPDES) program. NPDES requires permits for direct discharges to surface waters. The permits contain limits based upon either effluent (discharge) standards, or, if they are more stringent, ambient (overall water quality) standards. NPDES permits are issued, monitored, and enforced by EPA, or by a State agency authorized by EPA to administer an equivalent State program.

Highlight 1: CATEGORIES OF POLLUTANTS

- **Toxic pollutants** -- the 126 individual priority toxic pollutants contained in 65 toxic compounds or classes of compounds (including organic pollutants and metals) adopted by EPA pursuant to the CWA section 307(a)(1);
- **Conventional pollutants** -- the pollutants classified as biochemical oxygen demand (BOD), total suspended solids (TSS), fecal coliform, oil and grease, and pH pursuant to the CWA section 304(a)(4); and
- **Nonconventional pollutants** -- any pollutant not identified as either conventional or toxic in accordance with 40 CFR section 122.21(i)(2).

An on-site discharge from a CERCLA site to surface waters must meet the substantive NPDES requirements, but need not obtain an NPDES permit nor comply with the administrative requirements of the permitting process, consistent with CERCLA section

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121(e)(1). On the other hand, an off-site discharge from a CERCLA site to surface waters is required to obtain an NPDES permit and to meet both the substantive and the administrative NPDES requirements. (See **Highlight 2** for CERCLA activities considered to be direct discharges.) Occasionally, more than one CWA direct discharge requirement may potentially apply to a surface-water cleanup (see Section III for resolution of this issue).

Highlight 2: CERCLA ACTIVITIES CONSIDERED TO BE DIRECT DISCHARGES

From a Point Source:

- **On-site Waste Treatment:** wastewater is discharged from a treatment plant directly into, or in very close proximity to, a surface-water body through a discernible conveyance such as a pipe, ditch, channel, tunnel, or well.
- **Off-site Treatment:** wastewater from the site is piped or otherwise discharged through a discernible conveyance to an off-site surface-water body.
- **Any Remedial Action:** site runoff is channeled directly to a surface-water body through a ditch, culvert, storm sewer, or other means.

From a Nonpoint Source:

- Unchanneled runoff from a site into surface water.

1. Substantive Requirements

a. Ambient Water Quality Standards

Federal Water Quality Criteria (WQC) - Federal WQC are non-enforceable guidelines that set concentrations of pollutants which, when published, were considered adequate to protect surface waters. The WQC may be relevant and appropriate to CERCLA cleanups based upon an evaluation of four criteria set forth in CERCLA section 121(d): (1) uses of the receiving water body; (2) media affected; (3) purposes of the criteria; and (4) current information. Under CWA section 304, EPA has developed WQC for: (1) protection of human health; and (2) protection of aquatic life.

State Antidegradation Requirements/Use Classifications - Under the CWA, every State is required to classify all of the waters within its boundaries according to its intended use. EPA regulation requires States to establish antidegradation requirements. As a result, discharges that result from CERCLA response actions to high-quality receiving waters could be prohibited or limited, unless an ARAR waiver (such as inconsistent application by the State) is available. State antidegradation requirements may be applicable to both point and nonpoint source discharges. (A point source is a discernible conveyance such as a pipe, ditch, channel, tunnel or well from which pollutants may be discharged.)

b. Effluent Standards

Technology-Based Limitations - CWA section 301(b) requires that, at a minimum, all direct discharges meet technology-based limits. Technology-based requirements for conventional pollutant discharges include application of the best conventional pollutant control technology (BCT). For toxic and nonconventional pollutants, technology-based requirements include the best available technology economically achievable (BAT). Because there are no national effluent limitations regulations for releases from CERCLA sites, technology-based treatment requirements are determined on a case-by-case basis using best professional judgment (BPJ) to determine BCT/BAT equivalent discharge requirements. Technology-based limits for water discharges are often expressed as concentration levels. Technology-based limits are applicable to direct discharges from a point source.

State Water Quality Standards (WQS) - Under CWA section 303, States must develop water quality standards. State WQS may be numeric or narrative. Where State WQS are narrative, either the whole-effluent or the chemical-specific approach is generally used as the standard of control. State WQS may be applicable to both point and nonpoint source discharges.

2. Administrative Requirements

An off-site direct discharge from a CERCLA response action to surface waters requires an NPDES permit. The requirements for obtaining a permit include:

- **Certification Requirements:** the applicant for an NPDES permit must receive certification from the State that the discharge will be in compliance with CWA sections 301, 302, 303, 306, and 307;
- **Permit Application Requirements:** an application for an NPDES permit for a new discharge must be made 180 days prior to the actual discharge; pollution control equipment must be installed before the new discharge begins; and compliance must be achieved within the shortest feasible time, not to exceed 90 days;

- **Reporting Requirements:** the NPDES permit requires a discharger to maintain records and to report periodically on the amount and nature of pollutants in the discharged wastewaters; and

- **Public Participation Requirements:** the NPDES discharge limitations and requirements developed for a CERCLA site are subject to public participation requirements, including public notice and public comment.

B. CWA INDIRECT DISCHARGE REQUIREMENTS (Pretreatment Program for Nondomestic Users of POTWs)

Under CWA, all discharges by nondomestic users into POTWs must meet pretreatment standards. The purpose of pretreatment standards is to avoid the introduction of pollutants into municipal wastewater treatment plants that pass through, interfere with, or are otherwise incompatible with, such treatment works. The pretreatment standards are found in the national pretreatment program and in all State and local pretreatment regulations. There are three types of pretreatment standards (see **Highlight 3**).

Any discharge from a CERCLA site to a POTW is considered an off-site activity. It is, therefore, subject to both the substantive and administrative requirements of the national pretreatment program, and to all applicable State and local pretreatment regulations.

Highlight 3: TYPES OF PRETREATMENT STANDARDS

- **Prohibited discharge standards** apply to all nondomestic discharges and prohibit pollutants that cause fire or explosions, corrosion, obstructions, high temperatures at POTWs, problems with worker health and safety, or interference.

- **Categorical pretreatment standards** are national, technology-based effluent limitations developed by EPA for certain industrial categories. Currently no national standards exist for CERCLA discharges.

- **Local limits** are developed by qualifying POTWs, and are designed to ensure compliance with specific environmental standards and criteria at the local level.

1. Discharge of CERCLA Wastewater to a POTW

Wastewater from a CERCLA site may be sent to a POTW that either has or does not have an EPA-approved pretreatment program. A POTW with an approved pretreatment program already has the mechanisms necessary to ensure that discharges, including those from a CERCLA site, comply with applicable pretreatment standards and requirements. Remedial Project Managers (RPMs) must evaluate a POTW without an approved pretreatment program to determine whether it has sufficient mechanisms for meeting the requirements of the national pretreatment program when accepting CERCLA wastewater.

The determination of whether the POTW can accept CERCLA wastewater should be made during the RI/FS stage of the remedial action. Factors for determining a POTW's ability to accept CERCLA wastewater include:

- The quantity and quality of the CERCLA wastewater and its compatibility with the POTW;

- The impacts of a CERCLA discharge on the POTW's treatment system and on its continued compliance with its NPDES permit;

- The POTW's record of compliance with its NPDES permit and pretreatment program requirements to determine if the POTW is a suitable disposal site for the CERCLA wastewater;

- The potential for volatilization of the wastewater constituents at the CERCLA site, while moving through the sewer system, or at the POTW, and its potential impact on air quality;

- The potential for ground-water contamination from the transport of the CERCLA wastewater or impoundment at the POTW, and the need for ground-water monitoring;

- The potential effect of the CERCLA wastewater upon the POTW's discharge as evaluated by maintenance of water quality standards in the POTW's receiving waters;

- The POTW's knowledge of and compliance with any RCRA requirements or requirements of other environmental statutes; and

- The various costs of managing the CERCLA wastewater, including all risks, liabilities, permit fees, etc.

In addition to these factors, off-site discharges of CERCLA wastewaters may only be made to facilities (generally POTWs) in compliance with the CERCLA off-site policy (OSWER Directive 9834.11, November 1987,

at p. 11; see also 40 CFR 300.440 (proposed), 53 FR 48218, November 29, 1988).

2. Applicable POTW Control Mechanisms (Permits or Orders)

It is likely that RPMs will have to obtain from POTWs permits or orders for CERCLA remedies involving indirect discharges to such POTWs. POTWs have the authority to limit or reject wastewater discharges and to require dischargers to comply with control mechanisms such as permits or orders. These permits or orders contain applicable pretreatment standards including local discharge prohibitions and numerical discharge limits. In addition to incorporating pretreatment limitations and requirements, the control mechanisms may also include: (1) monitoring and reporting requirements to ensure continued compliance with applicable pretreatment standards; (2) spill prevention programs to prevent the accidental discharge of pollutants to POTWs (e.g., spill notification requirements); and (3) other requirements.

C. DREDGE-AND-FILL REQUIREMENTS

Any discharge of dredge-and-fill material into the navigable waters of the United States, including wetlands, is subject to the requirements of certain regulatory authorities (see **Highlight 4**). These requirements ensure that impacts on aquatic ecosystems are evaluated. CERCLA activities that may be considered dredge-and-fill activities include, but are not limited to, the following:

- Dredging of contaminated lake, river, or marine sediments;
- Disposal of contaminated soil, waste material, well-drilling materials, or dredged material in surface water, including most wetlands;
- Capping of a site containing wetlands;
- Construction of berms and levees to contain wastes;
- Stream channelization; and
- Excavation to contain effluent.

D. COORDINATION BETWEEN SUPERFUND AND WATER OFFICES

RPMs are required to identify potential CWA ARARs when considering a discharge to surface waters, a discharge to a POTW, or dredging of surface-water sediments. In order to identify and communicate ARARs in a timely manner, each EPA Region should establish procedures between the Regional Superfund and Water offices. The Superfund and the Water offices should coordinate their activities at the following stages of the remedy selection process:

Highlight 4: DREDGE-AND-FILL AUTHORITIES

Dredge-and-fill activities are regulated under the following authorities:

- **Section 10 of the Rivers and Harbors Act** prohibits the unauthorized obstruction or alteration of any navigable water of the United States.
- **Section 404 of the Clean Water Act** regulates the discharge of dredged or fill material to waters of the United States. It applies to all discharges of dredged or fill material to U.S. waters, regardless of the condition of the wetland. While section 404, when applicable, requires consideration of any practicable alternatives, there is no duty to mitigate adverse effects from previous dischargers. However, it may be appropriate in some circumstances to protect the environmental values of the site.
- **Section 103 of the Marine Protection Research and Sanctuaries Act** regulates ocean discharges of materials dredged from waters of the United States.
- **40 CFR Part 6, Appendix A** contains EPA's regulations for implementing Executive Order 11990, Protection of Wetlands, and Executive Order 11988, Floodplain Management, which require Federal agencies, wherever possible, to avoid or minimize adverse impacts of Federal actions upon wetlands and floodplains (including dredge-and-fill activities). The proposed plan and selected remedial action should be evaluated in light of these requirements and the alternative modified, if necessary, to avoid or minimize adverse impacts.

- **Preliminary Assessment/Site Investigation.** For planning purposes, copies of pertinent documents may be sent to the Water offices (Regional and State, if appropriate) to promptly notify them of possible remedial actions involving discharges to surface waters.
- **Remedial Investigation/ Feasibility Study.** To provide and obtain additional information regarding the site and the potential contamination of the surface water, copies of the RI/FS Workplan (draft and final), the RI/FS Report, and the Proposed Plan may be sent to the Water offices. In addition, close coordination should occur during the initial and detailed screening of alternatives.

- **Selection of Remedy/Record of Decision.** To ensure that the selected remedy attains all CWA ARARs (or other health- or risk-based levels when ARARs are waived or do not exist) and is adequately documented, the Water offices should be contacted for additional information.

- **Remedial Design/Remedial Action.** To help ensure that the selected remedy will attain all ARARs, the Water offices should be consulted during the RD/RA.

II. Compliance With The Safe Drinking Water Act

The Safe Drinking Water Act of 1974 (SDWA), as most recently amended in 1986, requires EPA to establish regulations to protect human health from contaminants in drinking water. To achieve this, EPA has developed: (1) drinking water standards; (2) a permit program for the underground injection of wastes (the Underground Injection Control (UIC) Permit Program); and (3) ground-water protection programs (the Sole Source Aquifer Program and the Wellhead Protection Program).

A. DRINKING WATER STANDARDS

1. National Primary Drinking Water Regulations

The drinking water regulations are applicable to public water systems (defined as systems) having at least 15 service connections or serving at least 25 year-round residents. National primary drinking water regulations consist of contaminant-specific standards known as Maximum Contaminant Levels (MCLs), which are set as close as feasible to Maximum Contaminant Level Goals (MCLGs) (see **Highlight** 5). "Feasibility" is based upon best technology and it takes cost into consideration.

Highlight 5: DEFINITIONS OF MCLs AND MCLGs

Maximum Contaminant Levels are enforceable standards that apply to specified contaminants which EPA has determined have an adverse effect on human health above certain levels.

Maximum Contaminant Level Goals are non-enforceable health-based goals that are established at levels at which no known or anticipated adverse effects on the health of persons occur and which will allow an adequate margin of safety.

CERCLA section 121(d)(2)(A)(i) requires on-site CERCLA remedies to attain standards or levels of control established under the SDWA (i.e., MCLs, where they are applicable or relevant and appropriate). CERCLA section 121(d)(2)(A) also requires on-site remedies to attain MCLGs where relevant and appropriate under the circumstances of the release. EPA believes that MCLGs set at levels above zero should be attained where relevant and appropriate as cleanup levels for ground or surface waters that are current or potential sources of drinking water. If the MCLG is equal to zero, the Agency believes it is not appropriate for setting cleanup levels, and the corresponding MCL will be the potentially relevant and appropriate requirement. (In some instances, MCLs will also be applicable if the water is delivered through a public water supply system having the requisite number of service connections and year-round customers mentioned above.)

2. Secondary Drinking Water Regulations

Secondary drinking water regulations consist primarily of Secondary Maximum Contaminant Levels (SMCLs) for specific contaminants or water characteristics that may affect the aesthetic qualities of drinking water (i.e., color, odor, and taste). SMCLs are nonenforceable limits intended as guidelines for use by States in regulating water supplies. SMCLs are guides for public water systems and are typically measured at the tap of the user of the system. However, SMCLs are potential relevant and appropriate requirements in States that have adopted SMCLs as additional drinking-water standards.

B. UNDERGROUND INJECTION CONTROL PROGRAM (UIC)

Under the UIC program, owners and operators of certain classes of underground injection wells are required to obtain and adhere to the requirements of operating permits. The permit applicant must prove to the State or Federal permitting authority that operation of the underground injection will not endanger drinking-water sources. For regulatory and reporting purposes, underground injection wells are divided into five categories. Class I, Class IV, and Class V wells are most likely to be associated with CERCLA response actions (see **Highlight 6**).

Highlight 6: DESCRIPTION OF CLASS I, IV, AND V WELLS

- Class I wells are used to inject industrial, hazardous, and municipal wastes beneath the lower most formation containing, within one-quarter mile (1/4) of the well bore, an underground drinking-water source.

- Class IV wells are used to inject hazardous or radioactive waste into or above a formation containing, within one-quarter mile (1/4) of the well bore, an underground drinking-water source.

- Class V wells include all wells not incorporated in Classes I through IV, and are typically recharge wells, septic system wells, and shallow industrial (non-hazardous) disposal wells.

An abandoned or failed Class I and Class IV injection well facility could be a site of a CERCLA action, or the CERCLA response action may include the reinjection of treated ground water. In addition, a CERCLA cleanup could involve the reinjection of nonhazardous waste water to a Class V well. In each case, requirements under the UIC program may be potential ARARs.

1. Substantive Requirements

a. The SDWA UIC Provisions

The injection of hazardous wastes from CERCLA sites into wells constructed both on-site or off-site must meet the substantive requirements of the UIC program. In general, no owner or operator may construct, operate, or maintain an injection well in a manner that results in the contamination of an underground source of drinking water at levels that violate MCLs or otherwise affect the health of persons. While the UIC regulations expressly refer to MCLs (40 CFR Parts 142, 144), non-zero MCLGs will generally be potential relevant and appropriate requirements for CERCLA cleanups involving an on-site injection well containing ground water potentially used for drinking water. In addition, all owners and operators of underground injection wells are subject to UIC closure requirements. Finally, injection of hazardous wastes into a Class I well requires compliance with additional UIC construction, operating, and monitoring requirements.

b. The Resource and Conservation and Recovery Act (RCRA)

Under section 3020 of RCRA, the injection of hazardous wastes into Class IV injection wells is banned unless: (1) the injection is a CERCLA response action or a RCRA corrective action; (2) the contaminated ground water is treated to substantially reduce hazardous constituents prior to each injection; and (3) the response action or corrective action is sufficient to protect human health and the environment upon completion. These requirements are potential ARARs for the reinjection of hazardous waste into Class IV wells in a pump-and-treat remediation system.

Because reinjection of treated contaminated ground water at CERCLA sites is specifically addressed in RCRA section 3020, RCRA land disposal restrictions (sections 3004(f), (g) and (m)) are not applicable to each reinjection or to the conclusion of a pump-and-treat remediation. EPA also expects that generally they will not be found to be relevant or appropriate requirements. Therefore, the best demonstrated available technology (BDAT) generally will not have to be met for each reinjection or at the conclusion of a pump-and-treat remediation involving a Class IV well. (See the Don Clay, AA (OSWER), Memorandum on the "Applicability of Land Disposal Restrictions to RCRA and CERCLA Groundwater Treatment Reinjection," December 27, 1989, OSWER Directive 9234.1-06).

RCRA also requires the owner or operator of a Class I UIC well to comply with RCRA corrective action, for releases from solid waste management units, if the permit was issued after November 8, 1984 (see 40 CFR 270.60).

2. Administrative Requirements

Off-site CERCLA actions must comply with the following administrative requirements of the UIC Program:

- **Application requirements.** All existing and new underground injection wells must apply for a permit unless an existing well is authorized by rule for the life of the well;

- **Inventory and Other Information Requirements.** Existing underground injection wells that are authorized by rule are required to submit inventory information to EPA or an approved State. Other information may be required to determine whether injection will endanger an underground source of drinking water; and

- **Reporting Requirements.** Owners and operators of Class I wells are required to maintain records and report quarterly on the characteristics of injection fluids and ground-water monitoring wells and various operating parameters (e.g., pressure, flow rate, etc.).

NOTE: Off-site CERCLA actions must also comply with CERCLA requirements for off-site transfers of waste. (OSWER Directive 9834.11, November 1987; 53 FR 48218, November 29, 1988).

C. SOLE SOURCE AQUIFER (SSA) PROGRAM

The SDWA permits EPA to designate as "sole source aquifers" any aquifer that is the sole source or principal drinking-water source for an area and which, if contaminated, would present a significant hazard to human health. Under the SSA program, Federal financial assistance (from any Federal Agency) may not be committed for any project that may contaminate a sole source aquifer so as to create a significant public health hazard. Generally, CERCLA activities would not in and of themselves increase pre-existing contamination of sole source aquifers. Therefore, it is unlikely that CERCLA activities would be subject to restrictions on Federal financial assistance. Nonetheless, a review of any potential problems associated with sole source aquifers should be part of the RI/FS process.

D. WELLHEAD PROTECTION PROGRAM

The 1986 amendments to the SDWA direct States to develop and implement programs to protect wells and recharge areas that supply public drinking-water systems from contaminants that flow into the well from the surface and subsurface. Because the Wellhead Protection program is designed to be run by the States, the program will not involve Federal ARAR provisions. Nonetheless, State Wellhead Protection programs may impose requirements that may be ARARs for CERCLA response actions. RPMs should be aware of State Wellhead Protection program requirements and should coordinate with the appropriate Regional drinking-water program personnel assigned to the Wellhead Protection program.

III. RESOLUTION OF POTENTIALLY CONFLICTING ARARS

For relevant and appropriate requirements, the very availability of a certain requirement often suggests that other requirements, which are less well suited to the circumstances, are not relevant and appropriate. Several conceivable conflicts among potential relevant and appropriate requirements concerning surface water may be resolved as follows:

- Where surface water serves as actual or potential drinking-water source and there are no impacts to aquatic organisms, the following requirements should be attained where relevant and appropriate:

  (1) State WQS that are designated for drinking-water use, and are more stringent than Federal standards, or specific to the uses of that water body; or, if none

  (2) Non-zero MCLGs; or, if none

  (3) MCLs; or, if none

  (4) Federal WQC adjusted for drinking-water use.

- For non-drinking surface water and there are no impacts to aquatic organisms, attain where relevant and appropriate, the stricter of:

  (1) State WQS; or

  (2) Technology Based Limitations.

- For non-drinking surface water and there are impacts to aquatic organisms, attain, where relevant and appropriate:

  (1) State WQS; or, if none

  (2) Federal WQC.

Discharge of Wastewater from CERCLA Sites into POTWs

34

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

APR 15 1986

MEMORANDUM

SUBJECT: Discharge of Wastewater from CERCLA Sites into POTWS

FROM: Henry L. Longest II, Director
Office of Emergency and Remedial Response

Rebecca Hanmer, Director
Office of Water Enforcement and Permits

Gene A. Lucero, Director
Office of Waste Programs Enforcement

TO: Waste Management Division Directors
Regions I - X

Water Management Division Directors
Regions I - X

A number of emergency removals and remedial cleanup actions under CERCLA will involve consideration of publicly owned treatment works (POTWs) for discharge of wastewater. The current off-site policy (issued on May 6, 1985) does not address the set of concerns and issues unique to POTWs that must be evaluated during the Remedial Investigation and Feasibility Study (RI/FS) for discharge of CERCLA wastewater to POTWs.

Recently, we have had meetings with representatives of the Association of Metropolitan Sewerage Authorities (AMSA) to discuss technical and policy concerns related to the POTW/CERCLA issue. This memorandum is to highlight some of the major points under consideration which were shared with AMSA at their recent Winter Technical Conference. The Agency intends to develop policy on the use and selection of POTWs for CERCLA wastewater. Your comments are sought on the proposed criteria set forth herein. These criteria may be useful in evaluation of POTWs for response actions (fund financed or responsible party financed) to be taken in the interim.

Our position is that no CERCLA discharges to a POTW should occur unless handled in a manner demonstrated to be protective of human health and the environment. Full compliance with all applicable requirements of the Clean Water Act (CWA), the Resource Conservation and Recovery Act (RCRA), and any other relevant or appropriate environmental statutes will be necessary .

The national pretreatment program, under the Clean Water Act, requires an analysis to determine whether the discharge of an industrial user of a POTW may pass through the POTW to cause receiving water quality problems or may interfere with POTW operations (including sludge disposal). If the analysis suggests that limits on the industrial user's discharge are needed to prevent pass through or interference, local limits or other safeguards, as necessary, must be established by the POTW and/or the NPDES permitting authority. The national pretreatment program requirements apply to the introduction of all non-domestic wastewater into any POTW, and include, among other things, the following elements:

- Prohibited discharge standards - prohibit the introduction of pollutants to the POTW which are ignitable, corrosive, excessively high in temperature, or which may cause interference or pass through at the POTW.

- Categorical discharge standards - include specific pretreatment standards which are established by EPA for the purpose of regulating industrial discharges in specific industrial categories.

- Local limits - where no categorical standards have been promulgated or where more stringent controls are necessary.

POTWs under consideration as potential receptors of CERCLA wastewaters may include those POTWs either with or without an approved pretreatment program. POTWs <u>with</u> an approved pretreatment program are required to have the mechanisms necessary to ensure compliance by industrial users with applicable pretreatment standards and requirements.* POTWs <u>without</u> an approved pretreatment program must be evaluated to determine whether sufficient mechanisms exist to allow the POTW to meet the requirements of the national pretreatment program in accepting CERCLA wastewaters. As noted above, pass through and interference are always prohibited, regardless of whether a POTW has an approved pretreatment program. POTWs without an approved pretreatment program must therefore have mechanisms which are adequate to apply the requirements of the national pretreatment program to specific situations.

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*POTWs with approved pretreatment programs must, among other things, establish procedures to notify industrial users (IUs) of applicable pretreatment standards and requirements, receive and analyze self-monitoring reports from IUs, sample and analyze industrial effluents, investigate noncompliance, and comply with public participation requirements.

Determination of a POTW's ability to accept CERCLA wastewater as an alternative to on-site treatment and direct discharge to receiving waters must be made during the Remedial Investigation/ Feasibility Study (RI/FS) process. During the remedial alternatives analysis, the appropriateness of using a POTW must be carefully evaluated. Water Division officials and their state counterparts should participate in the evaluation of any remedial alternatives recommending the use of a POTW, and should concur on the selection of the POTW.

If an alternative considers the discharge of wastewater from a CERCLA site into a POTW, the following points should be evaluated in the RI/FS prior to the selection of the remedy for the site:

- The quantity and quality of the CERCLA wastewater and its compatibility with the POTW (The constituents in the CERCLA wastewater must not cause pass through or interference, including unacceptable sludge contamination or a hazard to employees at the POTW; in some cases, control equipment at the CERCLA site may be appropriate in order to pretreat the CERCLA discharge prior to introduction to the POTW).

- The ability (i.e., legal authority, enforceable mechanisms, etc.) of the POTW to ensure compliance with applicable pretreatment standards and requirements, including monitoring and reporting requirements.

- The POTW's record of compliance with its NPDES permit and pretreatment program requirements to determine if the POTW is a suitable disposal site for the CERCLA wastewater.

- The potential for volatilization of the wastewater at the CERCLA site and POTW and its impact upon air quality.

- The potential for groundwater contamination from transport of CERCLA wastewater or impoundment at the POTW, and the need for groundwater monitoring.

- The potential effect of the CERCLA wastewaters upon the POTW's discharge as evaluated by maintenance of water quality standards in the POTW's receiving waters, including the narrative standard of "no toxics in toxic amounts".

- The POTW's knowledge of and compliance with any applicable RCRA requirements or requirements of other environmental statutes (RCRA permit-by-rule requirements may be triggered if the POTW receives CERCLA wastewaters that are classified as "hazardous wastes" without prior mixing with domestic sewage, i.e., direct delivery to the POTW by truck, rail, or dedicated pipe; CERCLA wastewaters are not all necessarily considered hazardous wastes; case by case determinations have to be made).

- The various costs of managing CERCLA wastewater, including all risks, liabilities, permit fees, etc. (It may be appropriate to reflect these costs in the POTW's connection fees and user charge system).

Based upon consideration of the above elements, the discharge of CERCLA wastewater to a POTW should be deemed inappropriate if the evaluation indicates that:

- The constituents in the CERCLA discharge are not compatible with the POTW and will cause pass through, interference, toxic pollutants in toxic amounts in the POTW's receiving waters, unacceptable sludge contamination, or a hazard to employees of the POTW.

- The impact of the transport mechanism and/or discharging of CERCLA wastewater into a POTW would result in unacceptable impacts upon any environmental media.

- The POTW is determined to be an unacceptable receptor of CERCLA wastewaters based upon a review of the POTW's compliance history.

- The use of the POTW is not cost-effective.

If consideration of the various elements indicates that the discharge of CERCLA wastewater to a POTW is deemed appropriate:

- There should be early public involvement, including contact with POTW officials and users, in accordance with the CERCLA community relations plan and public participation requirements.

- The NPDES permit and fact sheet may need to be modified to reflect the conditions of acceptance of CERCLA wastewaters; permit modification may be necessitated by the need to incorporate specific pretreatment requirements, local limits, monitoring requirements and/or limitations on additional pollutants of concern in the POTW's discharge or other factors.

Policy to be developed in the future will apply to all removal, remedial, and enforcement actions taken pursuant to CERCLA and Section 7003 of RCRA. We would appreciate your feedback on this memorandum and any experience in the use of POTWs for CERCLA removal or remedial actions that you have to offer.

If you have any comments or questions on this issue, please submit written comments to the workgroup co-chairs: Shirley Ross (FTS-382-5755) from the Office of Emergency and Remedial Response, or Victoria Price (FTS-382-5681) from the Office of Water.

cc: Ed Johnson
Russ Wyer
Tim Fields
Steve Lingle

ARARs Q's and A's:
Compliance with Federal Water Quality Criteria

35

United States Environmental Protection Agency

Office of Solid Waste and Emergency Response

Publication 9234.2-09/FS

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EPA

ARARs Q's & A's: Compliance With Federal Water Quality Criteria

Office of Emergency and Remedial Response
Office of Program Management OS-240

Quick Reference Fact Sheet

Section 121(d) of CERCLA, as amended by the 1986 Superfund Amendments and Reauthorization Act (SARA), requires that on-site remedial actions must at least attain Federal and more stringent State applicable or relevant and appropriate requirements (ARARs) upon completion of the remedial action. The 1990 National Contingency Plan (NCP) requires compliance with ARARs during remedial actions as well as at completion, and compels attainment of ARARs during removal actions whenever practicable. See NCP, 55 FR 8666, 8843 (March 8, 1990) (to be codified at 40 CFR section 300.414(i)), and 55 FR 8666, 8852 (March 8, 1990) (to be codified at 40 CFR 300.435(b)(2)).

To implement the ARARs provision, EPA has developed guidance, CERCLA Compliance With Other Laws Manual: Parts I and II (Publications 9234.1-01 and 9234.1-02), and has provided training to Regions and States on the identification of and compliance with ARARs. These "ARARs Q's and A's" are part of a series of Fact Sheets that provide answers to a number of questions that arose in developing ARAR policies, in ARAR training sessions, and in identifying and complying with ARARs at specific sites. This particular Q's and A's Fact Sheet addresses compliance with Federal Water Quality Criteria (FWQC) as ARARs.

Q1. What are the Federal Water Quality Criteria?

A. Federal Water Quality Criteria (FWQC) are nonenforceable guidance established by EPA for evaluating toxic effects on human health and aquatic organisms. FWQC are used or considered by the States in setting their water quality standards (WQSs) for surface water. State WQSs consist of designated uses (i.e., fishing, swimming, drinking water) and criteria for pollutants set at levels that are protective of those uses. State WQSs are regulatory requirements, and permit limits are established to ensure that the State use designations and criteria are met.

There are two categories of FWQC that relate to human exposure:

- Ingestion of contaminated drinking water and contaminated fish; and,
- Ingestion of contaminated fish alone.

FWQC have been published for many different contaminants (both noncarcinogens and carcinogens). FWQC for noncarcinogens are generally set above zero, and address chronic and toxic effects. FWQC for carcinogens are recommended at zero, although a range of concentrations corresponding to incremental cancer risks of 10^{-5}, 10^{-6}, and 10^{-7} are provided for informational purposes and do not represent an Agency judgement on an "acceptable" risk level.

In addition to the FWQC published for two human exposure scenarios, FWQC are published for four other categories. They consist of acute and chronic toxicity for fresh and saltwater aquatic life.

Q2. Do FWQC constitute potential ARARs for Superfund sites?

A. Yes. Although compliance with FWQC is not legally required at non-Superfund sites, and they are not "legally applicable" requirements under CERCLA, FWQC may be ARARs when found by the Agency to be relevant and appropriate (see final NCP preamble, 55 FR at 8742 (March 8, 1990). Specifically, CERCLA section 121(d)(2)(A) states that every remedial action "shall require a level or standard of control which at least attains ... water quality criteria established under section 304 or 303 of the Clean Water Act, where such ... criteria are relevant and appropriate under the circumstances of the release or threatened release."

Q3. When are FWQC best suited to serve as cleanup standards?

A. FWQC for specific pollutants should generally be identified as ARARs for surface-water cleanup if

particular circumstances exist at the site that FWQC were specifically designed to protect, unless the State has promulgated WQSs for the specific pollutants and water body at the site. Standards that are specifically suited to site circumstances should generally be used to establish cleanup levels at sites where those circumstances are present.[1] A State WQS may be a site-specific adaptation of a FWQC. In such cases, they are generally the appropriate standards for the specific pollutant and water body, rather than the FWQC. In the absence of any State WQSs specific to the pollutant and water body of concern, FWQC may be ARARs for surface-water bodies when:

- Protection of aquatic life is a concern. Examples include sites where:
  - adverse impacts to aquatic life are foreseen at the site; or
  - the surface-water bodies are designated for the protection of aquatic life.
- Human exposure from consumption of contaminated fish is a concern.

For sites where protection of aquatic life is a concern, the FWQC for fresh or saltwater aquatic life (whichever is pertinent) may be ARARs. When human exposure from consumption of contaminated fish is a concern (e.g., sites that require remediation of recreational water bodies, saltwater bodies, or estuaries used for fishing), the FWQC published for human exposure from consumption of fish may be ARARs for the sites. Examples include sites where the surface-water bodies are used for fishing and an exposure route consists of consumption of contaminated fish from the site.

Note, however, that if any of the above-mentioned water bodies are also used for drinking, standards for acceptable levels of contaminants in drinking water may also be potential ARARs for the site (e.g., non-zero maximum contaminant level goals (MCLGs), maximum contaminant levels (MCLs), State WQSs designated for drinking-water use, and FWQC adjusted to reflect cleanup standards for drinking water). (Question #5 of this fact sheet addresses how to determine the ARAR in these situations, when there are both drinking-water and environmental concerns at the site.)

[1] See proposed NCP preamble, 53 FR at 51442 (Dec. 21, 1988), and the final NCP preamble, 55 FR at 8755 (March 8, 1990). NOTE: the guidance set out in the proposed NCP is still effective where not superseded by guidance or regulations in the final NCP. See 55 FR at 8666, col. 3.

Q4. Should FWQC be used to set drinking-water cleanup levels for surface water at sites that do not present environmental concerns?

A. Rarely. FWQC should be used to set drinking-water cleanup levels only when surface water serves as an actual or potential drinking-water source and other cleanup standards for drinking water (e.g., non-zero MCLGs, MCLs, or State WQSs designated for drinking-water use) are not available. (see Question 5 if impacts to aquatic organisms have also been identified at the site). Where surface water serves as an actual or potential drinking-water source and there are no impacts to aquatic organisms, the following requirements, where relevant and appropriate, should be attained in the following order:

- State WQSs that are designated for drinking-water use, and are more stringent than MCLs or non-zero MCLGs, or specific to the uses of that water body; or, if none,
- Non-zero MCLGs; or, if none,
- MCLs; or, if none,
- FWQC adjusted for drinking-water use.

Q5. Should FWQC be used to set drinking water cleanup levels for surface water at sites that do present environmental concerns?

A. It depends. Generally, non-zero MCLGs or MCLs should be identified as the ARARs for cleanup of water that is or may be a potential source of drinking water. However, at sites that also present environmental concerns, RPMs should compare the stringency of the non-zero MCLGs or MCLs to the pertinent FWQC for aquatic life at the site. If the FWQC for the aquatic life are more stringent, they may be the relevant and appropriate requirements to meet at the site. For example, the levels needed to protect aquatic organisms from volatile organics are generally much less stringent than the levels needed to protect human exposure from drinking water. Therefore, non-zero MCLGs or MCLs would adequately protect both humans and most aquatic life from volatile organics. However, the levels needed to protect aquatic life from metals are more stringent than those levels required to protect human exposure from drinking water. As a result, the FWQC for aquatic organisms would protect both humans and aquatic life from metals, whereas non-zero MCLGs or MCLs may not.

Q6. Should FWQC be used to set cleanup standards for ground water?

A. Rarely. FWQC should be used to set cleanup standards for ground water only if the ground water is a current or potential source of drinking water, and other cleanup standards for drinking water (such as MCLs and non-zero MCLGs) are not available. If FWQC are used to set cleanup standards for ground water, the FWQC should first be adjusted for drinking-water use (as discussed in Question 7). Note: the issue becomes more complicated at sites where the ground water flows into the surface water. Where the ground water flows naturally into the surface water, the ground-water remediation should be designed so that the receiving surface-water body will be able to meet any ambient water-quality standards (such as State WQSs or FWQC) that may be ARARs for the surface water. This means that the FWQC should be considered when establishing cleanup levels for the ground water at those sites, but they are not necessarily ARARs for the cleanup of ground water. At sites where the discharge from a ground-water treatment facility will be deposited into the surface water, the discharged water will have to meet all effluent limitations found in the applicable State National Pollutant Discharge Elimination System (NPDES) permits, rather than the FWQC. (The NPDES effluent limitations will assure compliance with State WQSs.)

Q7. What is required to develop cleanup levels based on FWQC for human exposure from drinking water alone?

A. In those rare circumstances where the FWQC will be used to establish cleanup levels for drinking water, RPMs must adjust the original equation used to develop FWQC for human exposure from both ingestion of contaminated drinking water and contaminated fish. When adjusting the FWQC to develop cleanup standards for human exposure from drinking water alone, RPMs should use the standard exposure assumptions (i.e., 2 liters of water, 6.5 grams of edible aquatic products, and an average body weight of 70 kg), unless data are available indicating that the standard exposure assumptions are not pertinent to the area in which the site is located (see **Highlight 1**). Note, however, that adjustment of the FWQC for drinking is not simply a matter of sub-tracting one FWQC from another.

While it is possible to derive cleanup levels for drinking water from FWQC, FWQC were not intended to be used as drinking-water cleanup standards, since no criteria are provided for human exposure from ingestion of water alone. Moreover, the values derived from the FWQC (in contrast with those derived from MCLs and MCLGs) do not reflect the contribution of other sources through an apportionment factor. Therefore, FWQC may be less useful as cleanup standards for potential drinking water than the MCL/MCLG drinking-water standards (see proposed NCP preamble, 53 FR at 51442, and final NCP preamble, 55 FR at 8755).

Highlight 1: NONCARCINOGENIC EQUATION

For noncarcinogens, acceptable daily intakes (ADIs) and criteria derived therefrom are calculated from total exposure data that include contributions from the diet and air. The equation used to derive the criterion (C) is:

$$C = ADI \cdot (DT+IN)/[2 \text{ liters} + (0.0065 \text{ kg} \times R)]$$

where:

2 liters is assumed daily water consumption;
0.0065 kg is assumed daily fish consumption;
R is bioconcentration factor in units of 1/kg;
DT is estimated non-fish dietary intake; and
IN is estimated daily intake by inhalation.

The equation for carcinogens is not provided in this fact sheet because FWQC for carcinogens are recommended at zero, and therefore are not ARARs for the Superfund program (see Question #8 of this fact sheet).

Q8. How should EPA comply when FWQC for carcinogens are determined to be potential ARARs?

A. As previously mentioned, the recommended FWQC for carcinogens are set at zero. Consistent with Superfund policy on MCLGs, the zero-value FWQC, since they cannot be measured, would not be considered appropriate cleanup standards and, thus, are not "relevant and appropriate requirements" within the meaning of CERCLA section 121(d)(2)(A) (see final NCP preamble, 55 FR at 8755). Accordingly, they are not ARARs and, therefore, they do not need to be attained or waived.

For the carcinogens, the Office of Water Regulations and Standards (OWRS) has also published for informational purposes three concentration levels corresponding to incremental cancer risks of 10^{-5}, 10^{-6}, and 10^{-7}, respectively. OWRS has expressly stated in the preamble to their FWQC publications that it makes no judgment or recommendation as to which of the three concentrations provides an "acceptable" risk level for carcinogens. Instead, these concentration levels have been provided for informational purposes only and, therefore, simply constitute guidance to-be-considered (TBCs) for the Superfund program. As a result, an ARAR waiver is unnecessary for FWQC published for carcinogens;

Therefore, if these conditions are satisfied, the antidegradation provision should be met.[3]

[Note: If pump-and-treat reinjections fail to maintain the current quality of the aquifer, an interim action waiver could be invoked, assuming the aquifer will be suitable for its current use upon completion of the remediation.]

Scenario #2: Natural Attenuation

Assumption: The ground water is contaminated or, at a minimum, contains a plume of contamination. The ground water is a Class I or II aquifer (which means that it is or may be a potential source of drinking water).

A) **State ground-water antidegradation requirements that prohibit discharges:** These are not applicable to natural attenuation of the ground water because there is no discharge during natural attenuation.

Compliance: The statute is not applicable to natural attenuation, but it may be relevant and appropriate depending upon circumstances at the site (see Question #5 below).

B) **State antidegradation requirements that require ground-water maintenance consistent with its current uses:** These are potentially applicable to natural attenuation.

Compliance: The remedy generally would comply with these requirements during natural attenuation remediation, if the remedy maintains (i.e., does not adversely affect) the current quality of the aquifer. Moreover, it is unlikely that natural attenuation will interfere with the ground water's current uses, since natural attenuation is typically confined to sites where the contaminant level is low, there are small areas of contamination, and the plume will not migrate significantly. Therefore, natural attenuation generally should meet this type of antidegradation requirement.

[Note: Where such requirements are not met, an interim action waiver might be appropriate, assuming the aquifer will be suitable for its current use upon completion of the remediation.]

[3] Here, again, the State may argue that a more limited definition of "current uses" is the only valid interpretation. If so, consult ORC or OGC.

Scenario #3: Soil Flushing

Assumptions: The soil is contaminated. Through soil flushing, contaminated effluent will enter the ground water and then be extracted for treatment. The ground water is a Class I or II aquifer (which means that it is or may be a potential source of drinking water). The aquifer may or may not be contaminated.

A) **State ground-water antidegradation requirements that prohibit discharges:** These are likely to be applicable because the effluent from the soil flushing probably constitutes a discharge. However, the statute is violated only if the discharge constitutes the type prohibited by the statute.

Compliance: If, for example, the statute prohibits discharges injurious to public health, EPA may conclude that soil flushing would comply with it where the receiving aquifer is already contaminated. (A discharge of contaminated effluent into a contaminated aquifer generally would not be "injurious to public health.") Moreover, if pump-and-treat remediation is conducted concurrently with the soil flushing, EPA may conclude that the "discharge" is not injurious to public health because it would be controlled and contained through the pump-and-treat remediation.[4]

[Note: Since it is EPA's goal to restore ground water to its beneficial uses, the Superfund program would rarely propose a soil flushing remedy that would degrade pristine or only slightly contaminated water. Thus, the issue of compliance of soil flushing with an antidegradation standard should rarely be a problem for Superfund ground-water remediations. In rare cases where degradation of a pristine aquifer through soil flushing is necessary, RPMs should invoke the interim measures ARARs waiver.]

B) **State antidegradation requirements that require ground-water maintenance consistent with its current uses:** These presumably are applicable to soil flushing.

Compliance: The remedy generally would comply with these requirements during soil flushing, if the remedy maintains (i.e., does not adversely effect) the current quality of the aquifer. Current quality of the aquifer is maintained if the effluent at least meets current water quality levels of the aquifer. Because soil flushing is generally only considered for contaminated aquifers, these requirements typically may be met.[5]

[4] Again, the State may argue that a more limited interpretation is required. If so, consult ORC or OGC.

[5] State arguments that a more restrictive interpretation of the standard is required should be referred to ORC or OGC.

Highlight 1: KEY FACTORS FOR THE APPLICABILITY OF STATE GROUND-WATER ANTIDEGRADATION REQUIREMENTS TO SOIL FLUSHING

- Whether the State statute is triggered because either the effluent constitutes a "discharge" under the State law, or the State statute requires ground-water maintenance (during CERCLA remediation) consistent with current uses;
- Whether the statute defines "current uses" as present uses or pre-contamination uses;
- Whether the aquifer is pristine, slightly contaminated, or greatly contaminated;
- Whether the effluent has high contaminant levels; and,
- Whether soil flushing will be conducted concurrently with pump-and-treat remediation of the ground water.

Q5. Are State ground-water antidegradation requirements likely to be relevant and appropriate requirements for remediation that affects the ground water?

A. It depends upon whether the requirements are well-suited for use at the site. While examples are given below, a more definite answer cannot be given because relevance and appropriateness is a site-specific determination. See section 300.400(g)(2) of the revised NCP. (See the attached matrix for additional examples.)

For example, State antidegradation requirements that are applicable to discharges injurious to public health are potentially relevant and appropriate to all ground-water remediations (whether or not there is a discharge), by prohibiting remediations injurious to public health. These principles, when applied to CERCLA remediations, should be analyzed as follows:[6]

A) EPA does not consider pump-and-treat remediations of a contaminated plume to be injurious to public health because they are generally effective at containing and treating contaminated plumes. (See OSWER Directive 9355.4-03, October 1989, entitled "Considerations in Ground-Water Remediation at Superfund Sites"). Therefore, pump-and-treat remediations would generally comply with these requirements, if relevant and appropriate.

B) Natural attenuation remediation would also be expected to comply with these requirements prohibiting injurious discharges (if relevant and appropriate). Examples include sites where: (1) a contaminated plume is located within a Class III aquifer; (2) a contaminated plume is moving within parts of a Class I or II aquifer that are also significantly contaminated; or (3) the plume is small, its contaminant levels are low, and it will not migrate significantly. Natural attenuation might be said not to comply with these requirements if it allows a contaminated plume to move into a pristine, or only slightly contaminated portion of a Class I or II aquifer; the interim action waiver must be invoked at such sites, and precautions such as institutional controls should be taken.

C) Soil flushing generally would comply with these requirements, if relevant and appropriate, at sites where the aquifer is already contaminated. Contaminants from soil flushing might be said to be injurious to public health if introduced into a pristine, or only slightly contaminated portion of a Class I or II aquifer. In those rare cases where it is necessary to select this remedy at such sites, the interim action waiver must be invoked, and precautions such as institutional controls should be taken.

Highlight 2: COMPLIANCE WITH STANDARDS SET BELOW DETECTION LEVELS

State ground-water antidegradation standards that are set below detection levels cannot be measured or verified. Therefore, if such standards are applicable, the technical impracticability waiver should generally be invoked where compliance with such standards is not possible due to detection limits. Potentially relevant and appropriate standards that cannot be measured or verified may not be appropriate and, therefore, are not ARARs (see Preamble to the revised NCP, 55 FR 8750-8752).

Regions should not extrapolate from existing data or technologies to reach a level set below detection capabilities because such extrapolations cannot be verified scientifically with any degree of certainty. Without verification, neither the Agency nor the potentially responsible parties could legally establish that cleanup goals were met. Furthermore, the NCP states that relevant and appropriate requirements must be measurable and attainable since their purpose is to set a standard that an actual remedy will attain (see Preamble to the revised NCP, 55 FR 8752).

[6] The following reflects EPA's general analysis of how several types of remediation should be evaluated. The State may take a different and more limited view of what was intended under the statute. If the State argues for a different interpretation of its laws, consult ORC or OGC.

Highlight 3: POTENTIAL ARARs WAIVERS FOR STATE ANTIDEGRADATION REQUIREMENTS

The Interim Measure Waiver: This waiver provides that the action selected need not attain an ARAR where the action "is only part of a total remedial action that will attain such level or standard of control when completed." See CERCLA section 121(d)(4)(d). Therefore, the interim measures waiver may be used to waive ARARs for interim measures which, by their temporary nature, do not attain all ARARs. However, the interim measure must be followed by, or be part of, complete measures that attain all ARARs, and it should not exacerbate site problems nor interfere with the final remedy (see the revised NCP, 55 FR 8747-8748 (March 8, 1990)).

The Inconsistent Application of State Requirements Waiver: This waiver is intended to prevent the application to Superfund sites of State requirements that have not been consistently applied elsewhere in a State. State standards are presumed to have been consistently applied unless there is evidence to the contrary. When questioned by EPA, States may provide evidence of consistency of application by demonstrating: (1) the similarity of sites or response circumstances; (2) the proportion of noncompliance cases; (3) reasons for noncompliance; and (4) intentions to apply future requirements (see the revised NCP, 55 FR 8749 (March 8, 1990)).

NOTICE: The policies set out in this ARARs Q's and A's are intended solely for guidance. They are not intended, nor can they be relied upon, to create any rights enforceable by any party in litigation with the United States. EPA officials may decide to follow the guidance provided in this Q's and A's, or to act at variance with the guidance, based on an analysis of specific site circumstances. The Agency also reserves the right to change this guidance at any time without public notice.

MATRIX ANALYSIS OF STATE GROUND-WATER ANTIDEGRADATION REQUIREMENTS AS THEY PERTAIN TO CERTAIN REMEDIES AND SITE CIRCUMSTANCES*

REMEDY/SITE CIRCUMSTANCES

STATE LAW	GROUND-WATER REMEDIATION: PUMP AND TREAT (Aquifer With a Contaminated Moving Plume)	GROUND-WATER REMEDIATION: NATURAL ATTENUATION (Aquifer With a Contaminated Moving Plume)	SOIL REMEDIATION: SOIL FLUSHING (Where the Aquifer May or May Not Be Contaminated -- Followed by Pump and Treat)	SOIL REMEDIATION: SOIL FLUSHING (Where the Aquifer May or May Not Be Contaminated -- Concurrent With Pump and Treat)
1. The ground water must be protected. Discharges that are injurious to public health are prohibited. RAR:** ground-water remediations that are injurious to public health are prohibited. This may arguably occur if a remediation allows a contaminated plume to move.	• Not applicable if there is no discharge. If each reinjection is a "discharge," the requirement is met if the discharge is not "injurious to public health" (e.g., where the receiving aquifer is already contaminated, or if the reinjection has low contaminant levels). It is generally not a RAR if the plume is moving into parts of the aquifer that are also significantly contaminated. If it is a RAR, and it requires some degree of plume containment, we comply with it through pump and treat.	• Not applicable because there is no discharge. It is generally not a RAR if the plume is moving to parts of the aquifer that are also significantly contaminated. If it is a RAR, and it requires some degree of plume containment, we comply with it by limiting natural attenuation to sites where the plume will not migrate to the portions of the aquifer used for drinking and contaminant levels are low, thereby preventing injury to public health. Otherwise, we may use the interim action waiver, usually accompanied by institutional controls.	• May be a discharge; however, the requirement is met if the discharge is not injurious to public health (e.g., because the aquifer already exceeds health-based levels or if the discharge has low contaminant levels). If discharging to a pristine or slightly contaminated aquifer, we may use the interim action waiver.	• May be a discharge; however, the requirement is met if the discharge is not injurious to public health (e.g., because the aquifer already exceeds health-based levels or if the discharge has low contaminant levels). If it is an ARAR, we may comply with it by conducting pump and treat simultaneously, if the discharge (as it is part of a contained treatment system) is not injurious to public health. Otherwise, we may use the interim action waiver.
2. The ground water must be protected. No discharge is permitted unless a State Board issues a permit. RAR:** ground-water remediations must protect the ground water consistent with State permit standards (which may, for example, prohibit the introduction of contaminants into a portion of an aquifer used for drinking).	• Permits are not required (see CERCLA §121(e)(1)). Substantive requirements of the permit program are not applicable if there is no discharge. If each reinjection constitutes a "discharge," the requirement is met if each reinjection meets the substantive requirements of the permitting regulations (e.g., no "harmful" discharge). It is generally not a RAR if the plume is moving to parts of the aquifer that are also significantly contaminated. If it is a RAR, and it requires some degree of plume containment, we comply with it through pump and treat.	• Permits are not required (see CERCLA §121(e)(1)). Substantive requirements of the permit program are not applicable because there is no discharge. It is generally not a RAR if the plume is moving to parts of the aquifer that are also significantly contaminated. If it is a RAR, and it requires some degree of plume containment, we may comply with it by limiting natural attenuation to sites where the plume will not migrate into portions of the aquifer designated for drinking or other protected uses. Otherwise, we may use the interim action waiver, usually accompanied by institutional controls.	• May be a discharge; however, no permits are required under CERCLA §121(e)(1). If the substantive requirements of the permit program are ARARs, the action may comply if the contaminant levels of the effluent entering the ground water do not exceed the discharge standards set in the ROD (based on State permit requirements). Otherwise, we may use the interim action waiver.	• May be a discharge; however, no permits are required under CERCLA §121(e)(1). If the substantive requirements of the permit program are ARARs, the action may comply if the contaminant levels of the effluent entering the ground water do not exceed the discharge standards set in the ROD (based on State permit requirements). Otherwise, we may use the interim action waiver.

* This matrix provides general considerations only. Consult with ORC or OGC on specific applications.

** Relevant and Appropriate Requirement

MATRIX ANALYSIS OF STATE GROUND-WATER ANTIDEGRADATION REQUIREMENTS AS THEY PERTAIN TO CERTAIN REMEDIES AND SITE CIRCUMSTANCES*

REMEDY/SITE CIRCUMSTANCES

STATE LAW	GROUND-WATER REMEDIATION: PUMP AND TREAT (Aquifer With a Contaminated Moving Plume)	GROUND-WATER REMEDIATION: NATURAL ATTENUATION (Aquifer With a Contaminated Moving Plume)	SOIL REMEDIATION: SOIL FLUSHING (Where the Aquifer May or May Not Be Contaminated -- Followed by Pump and Treat)	SOIL REMEDIATION: SOIL FLUSHING (Where the Aquifer May or May Not Be Contaminated -- Concurrent With Pump and Treat)
3. **The ground water must be protected. No discharge is permitted to a usable aquifer.** **RAR:** ** **ground-water remediations that do not protect a usable aquifer are prohibited. This may occur if the remediation allows a contaminated plume to move.**	• Requirement is not applicable if there is no discharge. If each reinjection constitutes a "discharge," the requirement is not applicable if the prior contamination already rendered the aquifer unusable. The requirement is not a RAR if the plume has rendered the aquifer unusable or if the plume is moving to parts of the aquifer that are also significantly contaminated. If it is a RAR, and it requires some degree of plume containment, we comply with it through pump and treat.	• Requirement is not applicable because there is no discharge. Also, the requirement is not applicable if the plume has rendered the aquifer unusable. The requirement may not be a RAR if the plume has rendered the aquifer unusable or if the plume is moving to parts of the aquifer already contaminated. If it is a RAR, and it requires some degree of plume containment, we may comply with it by limiting natural attenuation to sites where the plume will not migrate to usable portions of the aquifer. Otherwise, we may use the interim action waiver, usually accompanied by institutional controls.	• May be a discharge; however, the requirement is not applicable if the aquifer is not usable (e.g., because it is already contaminated). This requirement is probably applicable if the aquifer is pristine or slightly contaminated. If so, we may use the interim action waiver.	• May be a discharge; however, the requirement is not applicable if the aquifer is not usable (e.g., because it is already contaminated). If it is an ARAR, we may comply with it by simultaneously conducting pump and treat if the prompt containment and treatment of contaminants protects usable portions of the aquifer. Otherwise, we may use the interim action waiver.
4. **The ground water must be protected. No discharge is permitted if it interferes with existing uses.** **RAR:** ** **ground-water remediations that interfere with existing or potential uses are prohibited. This may occur if the remediation allows a contaminated plume to move.**	• Requirement is not applicable if there is no discharge. If each reinjection constitutes a "discharge," the requirement is met if the existing uses(/quality) of the aquifer is maintained (e.g., where the aquifer is already contaminated). It would generally not be a RAR if the plume is moving to a portion of the aquifer that is already contaminated. If it is a RAR, and it requires some degree of plume containment, we comply with it through pump and treat.	• Requirement is not applicable because there is no discharge. It would generally not be a RAR if the plume is moving to a portion of the aquifer that is already contaminated. If it is a RAR, and it requires some degree of plume containment, we may comply with it by limiting natural attenuation to sites where contaminant levels are low and any plume migration will not affect the existing uses(/quality) of the aquifer. Otherwise, we may use the interim action waiver, usually accompanied by institutional controls.	• May be a discharge; however, the requirement is not applicable if the existing uses (/quality) of the aquifer is maintained (e.g., where the aquifer is already contaminated). This requirement is probably applicable if the aquifer is pristine or slightly contaminated. If so, we may use the interim action waiver.	• May be a discharge; however, the requirement is not applicable if the existing uses (/quality) of the aquifer is maintained (e.g., where the aquifer is already contaminated). This requirement is probably applicable if the aquifer is pristine or slightly contaminated. If so, we may use the interim action waiver.

* **This matrix provides general considerations only. Consult with ORC or OGC on specific applications.**

** **Relevant and Appropriate Requirement**

MATRIX ANALYSIS OF STATE GROUND-WATER ANTIDEGRADATION REQUIREMENTS AS THEY PERTAIN TO CERTAIN REMEDIES AND SITE CIRCUMSTANCES*

REMEDY/SITE CIRCUMSTANCES

STATE LAW	GROUND-WATER REMEDIATION: PUMP AND TREAT (Aquifer With a Contaminated Moving Plume)	GROUND-WATER REMEDIATION: NATURAL ATTENUATION (Aquifer With a Contaminated Moving Plume)	SOIL REMEDIATION: SOIL FLUSHING (Where the Aquifer May or May Not Be Contaminated -- Followed by Pump and Treat)	SOIL REMEDIATION: SOIL FLUSHING (Where the Aquifer May or May Not Be Contaminated -- Concurrent With Pump and Treat)
5. Maintain ground water at existing high quality unless the State Board approves the change to the water quality. [Statute requires ground-water maintenance at existing high quality during remediation. This may require containment of a contaminated moving plume.] RAR:** same as applicable.	• Requirement is not applicable if the ground water is not of high quality due to the contaminated plume. This requirement may be applicable if the aquifer is pristine or only slightly contaminated. If so, we may use the interim action waiver. It may be a RAR if the plume is moving to portions of the aquifer that are designated for drinking or other protected uses. If the requirement is a RAR, and it requires some degree of plume containment, we comply with it through pump and treat.	• Requirement is not applicable if the ground water is not of high quality due to the contaminated plume. If the requirement is a RAR, we may comply with it by limiting natural attenuation to sites where the plume contaminant levels are low and the plume will not migrate significantly. Otherwise, we may use the interim action waiver, usually accompanied by institutional controls.	• Requirement is not applicable if the ground water is already contaminated. This requirement may be applicable if the aquifer is pristine or only slightly contaminated. If so, we may use the interim action waiver.	• Requirement is not applicable if the ground water is already contaminated. This requirement may be applicable if the aquifer is pristine or only slightly contaminated. If so, we may use the interim action waiver.
6. Ground-water quality must be maintained commensurate with current uses. Statute requires maintenance of ground-water quality during remediation. This may require containment of a contaminated moving plume. RAR:** same as applicable.	• Requirement is presumably applicable. Requirement is met if the remedy maintains the current quality of the aquifer (e.g., where the reinjections at least meet current water uses(/quality) levels of the aquifer). If the requirement is an ARAR and it requires some degree of plume containment, we comply with it through pump and treat.	• Requirement is presumably applicable. Requirement is met if the remedy maintains the current uses(/quality) of the aquifer (e.g, where plume contaminant levels are low, there are small areas of contamination, and the plume will not migrate significantly). Otherwise, we may use the interim action waiver, usually accompanied by institutional controls.	• Requirement is presumably applicable. Requirement is met if the remedy maintains the current uses(/quality) of the aquifer (e.g., where the effluent at least meets the current water quality levels of the aquifer). Otherwise, we may use the interim action waiver.	• Requirement is presumably applicable. Requirement is met if the remedy maintains the current uses(/quality) of the aquifer (e.g., where the effluent at least meets the current water quality levels of the aquifer). Otherwise, we may use the interim action waiver.

* This matrix provides general considerations only. Consult with ORC or OGC on specific applications.

** Relevant and Appropriate Requirement

ARARs Q's and A's:
State Ground-Water Antidegradation Issues

36

United States Environmental Protection Agency

Office of Solid Waste and Emergency Response

Publication 9234.2-11/FS

July 1990

EPA

ARARs Q's & A's: State Ground-Water Antidegradation Issues

Office of Emergency and Remedial Response
Office of Program Management OS-240

Quick Reference Fact Sheet

Section 121(d)(2) of CERCLA, as amended by the 1986 Superfund Amendments and Reauthorization Act (SARA), requires that remedial actions must at least attain Federal and more stringent State applicable or relevant and appropriate requirements (ARARs) upon completion of the remedial action. The 1990 National Contingency Plan (NCP) requires compliance with ARARs during remedial actions as well as at completion, and mandates attainment of ARARs during removal actions to the extent practicable. See revised NCP, 40 CFR section 300.435(b)(2) (55 FR 8666, 8852)(March 8, 1990) and section 300.415(i) (55 FR 8666, 8843)(March 8, 1990).

This Q's and A's fact sheet is designed to provide guidance on the status of State ground-water antidegradation provisions as potential ARARs for CERCLA ground-water and soil remedial actions. The guidance in this fact sheet reiterates Agency policy already in practice in EPA's Regional offices. The goal and policy of the Superfund program is to return usable ground water to its beneficial uses within the timeframe that is reasonable, given the particular circumstances of the site. In addition to our goal of ground-water cleanup, Superfund has a nondegradation policy in that we strive for the prevention of further degradation of the ground water during our remedial actions. However, it should be noted that more stringent State standards than those imposed by EPA policy may be imposed by State antidegradation requirements. Such State requirements, if they have been determined to be ARARs for the site, would have to be met (e.g., by meeting the discharge requirements) or waived (e.g., by the interim remedy waiver). Nevertheless, even where temporary degradation of the ground water may be required during the remedial action, we will provide protection by restricting access or providing institutional controls, and EPA response actions will ultimately result in restoration of the ground water's beneficial uses.

(NOTE: States use the terms "nondegradation" and "antidegradation" interchangeably; there does not appear to be a consistent distinction between the two. As a result, all State nondegradation and antidegradation requirements are referred to in this fact sheet as antidegradation requirements.)

Q1. What is a State ground-water antidegradation requirement?

A. State antidegradation requirements vary widely in their scope and drafting. However, as a general rule, they are anti-pollution requirements (not cleanup requirements) designed to prevent degradation of the surface water or ground water. Antidegradation requirements typically accomplish their purpose in one of two ways: (1) by prohibiting or limiting discharges that potentially degrade the surface water or ground water (typically action-specific requirements); or (2) by requiring maintenance of the surface-water or ground-water quality consistent with current uses.

Under the Clean Water Act, every State is required to classify all of the waters within its boundaries according to their intended use. As required by EPA regulation, all States have established surface-water antidegradation regulations. These requirements may be potential ARARs for CERCLA remediations involving discharges to surface water. Although not specifically required by EPA, the majority of States have also established some form of ground-water antidegradation provisions. These States may have enacted specific ground-water antidegradation statutes, or they may include ground-water protection provisions within general environmental statutes. These State provisions for ground water may constitute potential ARARs for CERCLA remediations that have an impact upon the ground water (e.g., ground-water reinjection or soil flushing).

Q2. State antidegradation requirements are often expressed as general goals. Can they be potential ARARs?

A. Yes, antidegradation requirements expressed as general goals may be potential ARARs if they are:

(1) directive in nature and intent; and (2) established through a promulgated statute or regulation that is legally enforceable (see Preamble to the revised NCP at 55 FR 8746).

Antidegradation provisions are directive in nature when they contain narrative or numerical limits, or are implemented by State regulations that provide needed specificity. For example, general antidegradation goals are sufficiently directive when implemented by regulations setting limits that ground-water contamination may not exceed. When a general State antidegradation statute does not have any implementing regulations, EPA has considerable discretion in determining what is required to interpret or comply with the law (see Preamble to the revised NCP at 55 FR 8746).[1] For example, EPA may look at State surface-water or ground-water use and classification systems, such as those that set water-quality standards, since they designate uses of a given water body and/or maximum concentration levels to protect those uses. Alternatively, EPA may look at a State's wellhead protection program for requirements concerning ground-water maintenance. If the State's narrative, general antidegradation goals stand alone, they may be nothing more than statements of intent about desired outcomes or conditions. Statements of intent are insufficiently directive to constitute potential ARARs. Likewise, vague or ambiguous narrative descriptions of ground-water degradation limits probably do not provide sufficient direction to constitute potential ARARs (see Preamble to the revised NCP at 55 FR 8746).

To be considered a potential ARAR, a State antidegradation law must be established through a promulgated statute or regulation that is legally enforceable and "of general applicability" (see NCP, section 300.400(g)(4)). To be legally enforceable, State standards must be requirements -- not guidance -- that are issued according to the State procedural requirements and that contain certain specific enforcement provisions or are otherwise directly enforceable under State law (see Preamble to the revised NCP at 55 FR 8746). The phrase "of general applicability" means that potential State ARARs must be applicable to all remedial situations described in the requirement, not just to CERCLA sites (see Preamble to the revised NCP at 55 FR 8746).

Q3. At what point do State ground-water antidegradation requirements become ARARs at a Superfund site?

A. Antidegradation requirements are generally action-specific requirements that may apply during the course of and at the completion of the Agency response action. They apply prospectively, and generally obligate the Agency only to prevent **further** degradation of the water during and at completion of the response action (not prior to it). While antidegradation requirements are not cleanup laws, in some limited cases they may, as relevant and appropriate requirements, be appropriate for establishing a cleanup level for past contamination.

Furthermore, EPA is not required to take any response action unless and until EPA determines that it is appropriate to do so. Even then, this action must meet (or waive) a State requirement only if the Agency determines that the requirement is an ARAR for the site. The Agency determines what Federal and State laws constitute ARARs that must be met or waived during or at the completion of a response action. Compliance with a specific Federal or State law is triggered when the Agency determines that a requirement is either applicable to site remediation, or relevant and appropriate because its use is well-suited to site circumstances. However, neither CERCLA nor the NCP requires the Agency to comply with ARARs prior to conducting a response action. Therefore, when the Agency decides to take a response action, and if the Agency determines that a State antidegradation requirement is an ARAR for a site, the Agency must meet or waive the requirement.

It should also be noted that only ARARs within the scope of the response action have to be met or waived. If the Agency is conducting an RI/FS to determine the action that may be necessary at a site, the State's ground-water antidegradation requirements are generally beyond the scope of the action, and therefore are not likely to be potential ARARs for it. Of course, if a proposed RI/FS activity such as site sampling has the potential to temporarily degrade the ground water, the specific terms of the State ground-water antidegradation requirement should be examined to determine whether it is an ARAR for that action.

Q4. When are State ground-water antidegradation requirements likely to be applicable to CERCLA remediations that affect the ground water? When they are applicable, what is required for compliance?

A. The attached matrix analyzes whether six hypothetical State antidegradation requirements for ground water are ARARs for four different CERCLA remediations. For most sites, the matrix may be helpful in determining whether State antidegradation require-

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[1] The State may argue that its interpretation of the meaning of the goal, or the State's non-binding guidance, should determine the statute's meaning. The State may also argue that State courts have upheld the State's interpretation of the requirement. If either of these arguments is raised, advice should be sought from the Office of Regional Counsel (ORC) or the Office of General Counsel (OGC).

ments are ARARs for remediations that affect the ground water. The information in the text of this fact sheet is provided to give the specific analysis and rationale underlying the conclusions reached in the attached matrix. Although only two of the six hypothetical State antidegradation requirements are analyzed here in detail, these principles should generally apply to most State ground-water antidegradation requirements.

Applicability of State ground-water antidegradation requirements depends upon three factors:

- The specific language of the State statute or regulations;
- The nature of the CERCLA remediation; and
- The circumstances at the site.

First, a review of the specific language of the State statutes (or regulations) reveals that most antidegradation requirements fall into one of two categories: (1) those that focus upon prohibited discharges; and (2) those that focus upon maintaining the ground water consistent with its uses. Second, with respect to the nature of the CERCLA remediation, there are three forms of remediation that may trigger ground-water antidegradation requirements: ground-water pump-and-treat, ground-water natural attenuation, and soil flushing. Finally, applicability is affected by the circumstances at the site such as the contaminant levels of the effluent, and the quality of the receiving aquifer. The sections that follow provide hypothetical examples of the applicability of State ground-water antidegradation requirements. The examples discuss the applicability of the two categories of State antidegradation requirements under the three different remediation scenarios (i.e., pump and treat, natural attenuation, and soil flushing).

[Note on "current uses": Some State antidegradation statutes require maintenance of ground-water quality consistent with its "current uses." Where the State statute (or implementing regulation) has defined "current uses," that definition should be considered an integral part of the requirement that helps determine whether EPA response actions comply with these requirements, if they are determined to be ARARs. For example, any State antidegradation statute that defines "current uses" as "present uses" would be met at sites where the CERCLA discharge is to an aquifer that is already contaminated such that it has no present uses. State antidegradation requirements that do not define "current uses" will generally be met at Superfund sites where EPA ground-water or soil remediation maintains, or does not adversely effect, the current quality of the aquifer. The following analysis of antidegradation requirements for maintaining the ground water is based upon the assumption that they do not define "current uses."]

Scenario #1: Pump-and-Treat

Assumption: The ground water is contaminated or, at a minimum, contains a plume of contamination. The ground water is a Class I or II aquifer (which means that it is or may be a potential source of drinking water).

A) **State ground-water antidegradation requirements that prohibit discharges:** These are not applicable to ground-water pump-and-treat remedies if there is no "discharge," as defined under the ARAR. However, even if the reinjections associated with each iteration during pump-and-treat constitute a discharge under the State statute, the statute is violated only if the discharge constitutes the type prohibited by the statute.

Compliance: If, for example, the statute prohibits discharges that are injurious to public health, the remedy generally would comply with it where the receiving aquifer is already contaminated. (A discharge of contaminated effluent into a contaminated aquifer generally would not be "injurious to public health.")[2] Moreover, the discharge, as part of a contained pump-and-treat system, may not be injurious to public health. [Note: Since it is EPA's goal to restore ground water to its beneficial uses, the Superfund program would rarely propose a pump-and-treat remedy that would degrade pristine or only slightly contaminated water. In those rare cases where the remedy involves reinjections to a pristine or only slightly contaminated aquifer, an interim action waiver might be appropriate.]

B) **State antidegradation requirements that require ground-water maintenance consistent with its current uses:** These generally are applicable to ground-water pump-and-treat remediations.

Compliance: The remedy generally would comply with these requirements during pump-and-treat remediations, if the remedy maintains (i.e., does not adversely effect) the current quality of the aquifer. Current quality of the aquifer should generally be maintained through pump-and-treat for two reasons: (1) pump-and-treat remediation will decrease, not increase, the contaminant level of the aquifer; and (2) it serves to contain the contaminated plume.

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[2] A State may argue that it has interpreted the phrase "injurious to public health" in guidance or policies, or that court decisions have addressed the issue, and that EPA must follow that interpretation. If such an argument is raised, it must be referred to ORC or OGC.

ARARs Q's and A's Compliance with New SDWA National Primary Drinking Water Regulations for Organic and Inorganic Chemicals

37

United States Environmental Protection Agency

Office of Solid Waste and Emergency Response

Publication 9234.2-15/FS

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EPA

ARARs Q's & A's:

Compliance with New SDWA National Primary Drinking Water Regulations for Organic and Inorganic Chemicals

Office of Emergency and Remedial Response
Office of Program Management OS-240

Quick Reference Fact Sheet

Section 121(d) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the 1986 Superfund Amendments and Reauthorization Act (SARA), requires that on-site remedial actions must attain or waive Federal or more stringent State applicable or relevant and appropriate requirements (ARARs) upon completion of the remedial action. The 1990 National Oil and Hazardous Substances Pollution Contingency Plan (NCP) requires compliance with ARARs during remedial actions as well as at their completion, and compels attainment of ARARs during removal actions to the extent practicable, considering the exigencies of the situation. (See NCP, 55 FR 8666, 8852 (March 8, 1990)(codified at 40 CFR 300.435(b)(2)), and 55 FR 8666, 8843 (March 8, 1990)(codified at 40 CFR 300.415(i)).

To implement the ARARs provision, EPA developed guidance, CERCLA Compliance With Other Laws Manual: Parts I and II (Publications 9234.1-01 and 9234.1-02), and has provided training to Regions and the States on the identification of and compliance with ARARs. EPA also is preparing a series of short fact sheets to provide guidance on a number of questions that arose in developing ARAR policies, and in identifying and complying with ARARs at specific sites. This particular fact sheet addresses compliance with new Safe Drinking Water Act (SDWA) National Primary Drinking Water Regulations for organic and inorganic chemicals, which were promulgated on January 30, 1991. (See 56 FR 3526 January 30, 1991, to be codified at 40 CFR Parts 141, 142, and 143.)

Q1. What are these National Primary Drinking Water Regulations?

A. These National Primary Drinking Water Regulations (NPDWRs) establish Maximum Contaminant Level Goals (MCLGs) and Maximum Contaminant Levels (MCLs) for 31 organic and inorganic contaminants, which are effective July 30, 1992. They also repropose MCLGs and MCLs for 5 additional contaminants (aldicarb, aldicarb sulfoxide, aldicarb sulfone, pentachlorophenol, and barium) that were originally promulgated on July 8, 1987 and will become effective January 1, 1993. Finally, these regulations promulgate MCLGs and treatment technique requirements for acrylamide and epichlorohydrin. See **Highlight 1** for the definitions of MCLs and MCLGs. For the full text of these SDWA regulations, see 56 FR 3526 (January 30, 1991). See **Highlight 3** for a list of the contaminants and their corresponding MCLs and MCLGs.

Q2. Are MCLs potential ARARs for CERCLA sites?

A. Yes. CERCLA section 121(d)(2)(A)(i) requires on-site CERCLA remedial actions to attain or waive the "standards" or "levels of control" issued under the SDWA (i.e., MCLs) where they are applicable or relevant and appropriate. (Note: As mentioned in the introduction to this fact sheet, the NCP extends the statutory ARARs requirement to removals, to the extent practicable considering the exigencies of the situation, as well as remedial actions. (See section 300.415(i)(1) and (2) of the NCP, 55 FR 8843.)

MCLs are potentially **relevant and appropriate** during a CERCLA cleanup for ground or surface waters that are current or potential sources of drinking water. Since ground water contamination sites account for approximately 70 percent of all sites on the National Priorities List, these potentially

relevant and appropriate requirements are triggered frequently at CERCLA sites.

In addition, MCLs also may be **applicable** where water at a CERCLA site is delivered through a public water supply system, if that system has at least 15 service connections or serves at least 25 year-round residents. Since CERCLA projects only rarely treat tap water, however, there will be few instances in which MCLs are applicable for groundwater cleanup at a CERCLA site. (See NCP Preamble, 55 FR 8750 and CERCLA Compliance With Other Laws Manual, Part I, Publication 9234.1-01, August 1988, page 4-8.)

REMINDER: It makes a difference whether a requirement is **applicable** or **relevant and appropriate.** The "applicability" determination is a legal one, and it provides the Agency with very little flexibility. The "relevant and appropriate" determination is a site-specific determination, which provides the Agency with much greater flexibility since the Agency may determine that a requirement is not "appropriate", given site circumstances. (Therefore it would not be an ARAR for that site.) Waivers are also available if the requirement is relevant and appropriate but cannot be met for one of the reasons set out in CERCLA section 121(d)(4) (e.g., the ground water is a potential drinking water source and thus the MCL is relevant and appropriate, but attainment of the MCL is technically impracticable).

In contrast, an applicable requirement, once triggered at a site, must simply be met or waived. (For additional information on this issue, see "ARARs Q's and A's: General Policy, RCRA, CWA, SDWA & Administrative Record," Publication 9234.2-01/FS-A, July 1991.)

Q3. Are MCLGs potential ARARs for CERCLA sites?

A. Yes. Section 121(d)(2)(A) of CERCLA also requires on-site remedial actions to attain MCLGs under the SDWA "where they are relevant and appropriate under the circumstances" of the release or threatened release. Under the NCP, EPA requires that MCLGs set at levels above zero (i.e., non-zero MCLGs) be attained during a CERCLA cleanup where they are relevant and appropriate (i.e., generally for ground or surface waters that are current or potential sources of drinking water). If the MCLG is equal to zero, EPA determined under the NCP that the MCLG is not appropriate for setting cleanup levels. In those circumstances, the corresponding MCL will be the potentially relevant and appropriate requirement. (See section 300.430(e)(2)(i)(B) and (C) of the NCP, 55 FR 8848.)

REMINDER: Although MCLGs are potentially relevant and appropriate, they are never applicable requirements at a CERCLA response action because they are not enforceable "standards" or "levels of control."

Highlight 1:
Definitions of MCLs and MCLGs

Maximum Contaminant Levels (MCLs) are enforceable standards that apply to specified contaminants which EPA has determined to have an adverse effect on human health above certain levels. MCLs are set as close as feasible to MCLGs. Feasibility takes into account both technology and cost considerations.

Maximum Contaminant Level Goals (MCLGs) are non-enforceable health-based goals that have been established at levels at which no known or anticipated adverse effects on the health of persons occur and which will allow an adequate margin of safety.

See NCP Preamble, 55 FR 8750-8752.

Q4. What is the status of these regulations as potential ARARs for CERCLA projects?

A. These regulations were promulgated on January 30, 1991. The final MCLs and

Highlight 2: Status of Potential TBCs, RARs, and ARARs

Number of Final/ Reproposed MCLGs/MCLs	Potential To Be Considered (TBC)	Potential Relevant and Appropriate (RAR)	Potential Applicable, or Relevant and Appropriate (ARAR)
22 Final Non-Zero MCLGs	(Not Pertinent)	1/30/91 & Beyond	Not Applicable
31 Final MCLs	(Not Pertinent)	1/30/91 - 7/29/92	7/30/92 and Beyond
2 Treatment Techniques	(Not Pertinent)	1/30/91 - 7/29/92	7/30/92 and Beyond
4 Reproposed Non-Zero MCLGs	1/31/91 - 7/91[1]	7/91[1] & Beyond	Not Applicable
5 Reproposed MCLs	1/31/91 - 7/91[1]	7/91[1] - 1/93[2]	1/93[2] and Beyond

[1]Anticipated promulgation date
[2]Anticipated effective date

non-zero MCLGs for the 31 contaminants became potential relevant and appropriate requirements for all decision documents (i.e., Records of Decision (RODs) and Action Memoranda) signed on or after January 30, 1991. Because of the delayed effective date, the final MCLs for the 31 contaminants may be relevant and appropriate, but not applicable, for response actions carried out during the interim period prior to the effective date (i.e., between January 30, 1991 and July 29, 1992). In addition, the final non-zero MCLGs may be relevant and appropriate. For decision documents signed on July 30, 1992 and beyond, the MCLs for the 31 contaminants may be applicable or relevant and appropriate to the cleanup of ground water. **See Highlight 2** for the status of these regulations, outlining the critical dates for final and reproposed MCLGs and MCLs.

In contrast, the reproposed MCLs and non-zero MCLGs for the 5 additional contaminants are on a different regulatory track. They became potential criteria "to be considered" (TBCs) for all decision documents signed after January 30, 1991 and up to promulgation (on July 1, 1991). Because of the delayed effective date, for all decision documents signed between the date of promulgation (July 1, 1991) and the effective date (expected in January 1993), these MCLGs and MCLs may be relevant and appropriate, but not applicable. On their effective date (scheduled for January 1993) and beyond, the MCLs for the 5 additional contaminants may be applicable, or relevant and appropriate.

Q5. Are treatment techniques for drinking water contaminants in these regulations potential ARARs for CERCLA cleanups?

A. Generally, no. These NPDWRs have established treatment techniques for acrylamide and epichlorohydrin. These treatment techniques limit the amounts of acrylamide and epichlorohydrin that drinking water suppliers may add to treat contaminated drinking water. Since CERCLA projects generally do not supply drinking water as part of response actions, and often would be cleaning up contaminated ground water through methods (e.g., air stripping or natural attenuation) which do not involve the addition of these substances to treat contaminated ground water, these treatment techniques generally would not be relevant and appropriate requirements for the treatment of acrylamide and epichlorohydrin already found in the ground water. However, if a CERCLA project is supplying drinking water as part of the response action and is adding these substances as part of the treatment process, the treatment techniques would be potential ARARs.

Highlight 3: Jan. 30, 1991 National Primary Drinking Water Regulations

	1/91 Final MCLGs[1]	1/91 Final MCLs[1]	1/91 Reproposed MCLGs	1/91 Reproposed MCLs[1]
Inorganics				
Asbestos	7.0 MFL	7.0 MFL	—	—
Barium	—	—	2	2
Cadmium	0.005	0.005	—	—
Chromium	0.1	0.1	—	—
Mecury	0.002	0.002	—	—
Nitrate	10.0 (as N)	10.0 (as N)	—	—
Nitrite	1.0 (as N)	1.0 (as N)	—	—
Total Nitrate and Nitrite	10.0 (as N)	10.0 (as N)	—	—
Selenium	0.05	0.05	—	—
Organics				
o-Dichlorobenzene	0.6	0.6	—	—
cis-1, 2-Dichloroethylene	0.07	0.07	—	—
trans-1, 2-Dichloroethylene	0.1	0.1	—	—
1, 2-Dichloropropane	0	0.005	—	—
Ethylbenzene	0.7	0.7	—	—
Monochlorobenzene	0.1	0.1	—	—
Styrene	0.1	0.1	—	—
Tetrachloroethylene	0	0.005	—	—
Toluene	1.0	1.0	—	—
Xylenes (total)	10.0	10.0	—	—
Pesticides/PCBs				
Alachlor	0	0.002	—	—
Aldicarb	—	—	0.001	0.003
Aldicarb sulfoxide	—	—	0.001	0.004
Aldicarb sulfone	—	—	0.001	0.002
Atrazine	0.003	0.003	—	—
Carbofuran	0.04	0.04	—	—
Chlordane	0	0.002	—	—
Dibromochloropropane (DBCP)	0	0.0002	—	—
2, 4-D	0.07	0.07	—	—
Ethylene dibromide (EDB)	0	0.00005	—	—
Heptachlor	0	0.0004	—	—
Heptachlor epoxide	0	0.0002	—	—
Lindane	0.0002	0.0002	—	—
Methoxychlor	0.04	0.04	—	—
Polychlorinated biphenyls (PCBs) (as decachlorobiphenyl)	0	0.0005	—	—
Pentachlorophenol	—	—	0	0.001
Toxaphene	0	0.003	—	—
2, 4, 5-TP (Silvex)	0.05	0.05	—	—

Q6. How will these regulations affect CERCLA RODs that were signed prior to January 30, 1991?

A. These MCLGs and MCLs should not affect CERCLA RODs that were signed prior to January 30, 1991. The NCP states that ARARs "freeze" at the time of ROD signature, and newly promulgated requirements need only be met where necessary for protectiveness. See section 300.430(f)(1)(ii)(B)(1) of the NCP, 55 FR 8850. This means that only requirements which are promulgated (i.e., published as final regulations) prior to the date of ROD signature are potential ARARs for those RODs. Since these SDWA requirements were not promulgated until January 30, 1991, they would not be ARARs for RODS signed before that date.

While these requirements would constitute "newly promulgated requirements" for pre-1/30/91 RODs, they are not expected to require changes to existing RODs during the five-year protectiveness review of the remedy. These new SDWA requirements are not replacing any MCLGs or MCLs that were outside the CERCLA risk range, with standards inside that risk range. Therefore, they should not require any remedy revisions to maintain protectiveness during the five-year review. (See also NCP Preamble, 55 FR 8757.)

Q7. Are there other requirements in these regulations that may be ARARs or TBCs for CERCLA cleanups?

A. Yes. These regulations also contain monitoring requirements which may be ARARs when a CERCLA project supplies drinking water to affected communities as part of the response action. (See NCP Preamble, 55 FR 8757.) The regulations also contain administrative recordkeeping and reporting requirements. Although such requirements are neither ARARs nor TBCs, the Regions are strongly encouraged to consult with other agencies, as appropriate, to ensure coordination. (See NCP Preamble, 55 FR 8757.)

Q8. Are there other proposed or promulgated SDWA regulations that are potential ARARs or TBCs for CERCLA actions?

A. Yes. On June 7, 1991, EPA promulgated final MCLGs for lead and copper (see 56 FR 26461, June 7, 1991). Copper now has an MCLG of 1.3 parts per million. This is a potential relevant and appropriate requirement for CERCLA ground and surface water remediation. However, the MCLG for lead was set at zero, which is not considered to be an "appropriate" standard for CERCLA cleanups. (See NCP Preamble, 55 FR 8751-8752.) This SDWA regulation did not set any MCLs for either contaminant, but it did set a treatment technique for lead which is a potential ARAR. (Note: EPA is planning to provide additional ARARs guidance on lead in the near future.)

In addition, NPDWRs for 24 contaminants were proposed on July 25, 1990 (see 55 FR 30370, July 25, 1990). From July 25, 1990 until their expected promulgation (expected in March 1992), the MCLs and non-zero MCLGs found in these proposed regulations constitute TBCs for the cleanup of ground water and may be considered for decision documents signed during that period. See **Highlight 4** for a chart of the 24 contaminants and their corresponding proposed MCLs and MCLGs.

This fact sheet does not address two other SDWA regulations: Final, for 8 volatile organic compounds, on July 8, 1987 (see 52 FR 25690), and, proposed, for the radionuclides radon, uranuim, and radium, on July 18, 1991 (see 56 FR 33050).

NOTICE: The policies set out in this fact sheet are not final Agency action, but are intended solely as guidance. They are not intended, nor can they be relied upon, to create any rights enforceable by any party in litigation with the United States. Response personnel may decide to follow the guidance provided in this fact sheet, or to act at variance with the guidance, based on an analysis of site-specific circumstances. The Agency reserves the right to change this guidance at any time without public notice.

Highlight 4: Proposed National Primary Drinking Water Regulations

TBCs until Promulgation Date (Expected in March 1992)

Inorganics	MCLGs	MCLs
Antimony	0.03	0.01/0.005
Beryllium	00.001	0.001
Cyanide	0.2	0.2
Nickel	0.1	0.1
Sulfate	400/500	400/500
Thallium	0.0005	0.002/0.001
Organics		
Andipates [Di(ethylhexyl)adipate]	0.5	0.5
Dalapon	0.2	0.2
Dichloromethane (methylene chloride)	0	0.005
Dinoseb	0.007	0.007
Diguat	0.02	0.02
Endothall	0.1	0.1
Endrin	0.002	0.002
Glyphosate	0.7	0.7
Hexachlorobenzene	0	0.001
Hexachlorocyclopentadine (HEX)	0.05	0.05
Oxamyl (Vydate)	0.02	0.02
PAHs [Benzo(a)pyrene]	0	0.0002
Phthalates [Di(ethylhexyl)phthalate]	0	0.004
Picloram	0.5	0.5
Simazine	0.001	0.001
1,2,4-Trichlorobenzene	0.009	0.009
1,1+2Trichlorethane	0.003	0.005
2,3,7,8-TCDD (Dioxin)	0	5x10(-8)

because FWQC recommended at zero are not ARARs, the three alternative values are TBCs.

Q9. What other factors should be considered in determining whether FWQC are relevant and appropriate requirements?

A. CERCLA requires that in determining whether a FWQC constitutes a relevant and appropriate requirement, EPA must consider the designated or potential use of the surface or ground water, the environmental media affected, the purposes for which such criteria were developed, and the latest available scientific information available (see CERCLA section 121(d)(2)(B)(i)). With regard to this last factor, OWRS periodically publishes FWQC for additional constituents and occasionally updates existing ones. Prior to using an FWQC for a particular constituent, RPMs should consult the IRIS data base maintained by the EPA Office of Research and Development and contact their Regional Water Office for the most recent listing, to ensure consideration of the latest available scientific information. See Attachment 1 for a list of the FWQC, current as of June 15, 1990. [Note: the FWQC chart issued by the EPA Office of Water Regulations and Standards, dated January 2, 1987, is no longer current and should not be used as a reference.]

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ATTACHMENT 1
FEDERAL WATER QUALITY CRITERIA

A			B		C		D	
			FRESHWATER		SALTWATER		HUMAN HEALTH (10^{-6} risk for carcinogens)	
							For Consumption of:	
(#)	COMPOUND	CAS Number	Criterion Maximum Conc. (ug/L) B1	Criterion Continuous Conc. (ug/L) B2	Criterion Maximum Conc. (ug/L) C1	Criterion Continuous Conc. (ug/L) C2	Water & Organisms (ug/L) D1	Organisms Only (ug/L) D2
1	Antimony	7440360					14 *	4300 *
2	Arsenic	7440382	360	190	69	36	0.018 *†	0.14 *†
3	Beryllium	7440417					0.0076 †	0.131 †
4	Cadmium	7440439	3.9 **	1.1 **	43	9.3	10 *	170 *
5a	Chromium (III)	7440473	1700 **	210 **			33000 *	670000 *
b	Chromium (VI)	7440473	16	11	1100	50	170 *	3400 *
6	Copper	7440508	18 **	12 **	2.9	2.9	1300 *	
7	Lead	7439921	82 **	3.2 **	220	8.5	50	
8	Mercury	7439976	2.4	0.012	2.1	0.025	0.14	0.15
9	Nickel	7440020	1400 **	160 **	75	8.3	510 *	3800 *
10	Selenium	7782492	20	5	300	71	104 *	6800 *
11	Silver	7440224	4.1 **		2.3		91 *	
12	Thallium	7440280					2.0 *	7.2 *
13	Zinc	7440666	120 **	110 **	95	86		
14	Cyanide	57125	22	5.2	1	1	700 *	215000 *
15	Asbestos	1332214					30000 fibers/L	
16	2,3,7,8-TCDD (Dioxin)	1746016					0.000000013 †	0.000000014 †
17	Acrolein	107028					320	780
18	Acrylonitrile	107131					0.059 *†	0.67 *†
19	Benzene	71432					1.2 *†	71 *†
20	Bromoform	75252					5.7 *†	470 *†
21	Carbon Tetrachloride	56235					0.25 *†	4.5 *†
22	Chlorobenzene	108907					488	
23	Chlorodibromomethane	124481					5.7 *†	470 *†
24	Chloroethane	75003						
25	2-Chloroethylvinyl Ether	110758					0.032 *†	18 *†
26	Chloroform	67663					5.70 *†	470 *†
27	Dichlorobromomethane	75274					5.70 *†	470 *†
28	1,1-Dichloroethane	75343						
29	1,2-Dichloroethane	107062					0.38 *†	99 *†
30	1,1-Dichloroethylene	75354					0.057 *†	3.2 *†
31	1,2-Dichloropropane	78875						
32	1,3-Dichloropropylene	542756					10 *	1700 *
33	Ethylbenzene	100414					3100 *	29000 *
34	Methyl Bromide	74839					48 *	4000 *
35	Methyl Chloride	74873					5.7 *†	470 *†
36	Methylene Chloride	75092					4.7 *†	1600 *†
37	1,1,2,2-Tetrachloroethane	79345					0.17 *†	11 *†
38	Tetrachloroethylene	127184					0.8	8.85
39	Toluene	108883					10000 *	300000 *
40	1,2-Trans-Dichloroethylene	156605					700 *	140000 *
41	1,1,1-Trichloroethane	71556					3100 *	170000 *
42	1,1,2-Trichloroethane	79005					0.60 *†	42 *†
43	Trichloroethylene	79016					2.7 †	81 †
44	Vinyl Chloride	75014					2 †	525 †

(#)	A: COMPOUND	CAS Number	B: FRESHWATER Criterion Maximum Conc. (ug/L) B1	B: FRESHWATER Criterion Continuous Conc. (ug/L) B2	C: SALTWATER Criterion Maximum Conc. (ug/L) C1	C: SALTWATER Criterion Continuous Conc. (ug/L) C2	D: HUMAN HEALTH (10^{-6} risk for carcinogens) For Consumption of: Water & Organisms (ug/L) D1	D: HUMAN HEALTH (10^{-6} risk for carcinogens) For Consumption of: Organisms Only (ug/L) D2
45	2-Chlorophenol	95578					120 *	
46	2,4-Dichlorophenol	120832					93 *	790 *
47	2,4-Dimethylphenol	105679						
48	2-Methyl-4,6-Dinitrophenol	534521					13.4	765
49	2,4-Dinitrophenol	51285					70 *	14000 *
50	2-Nitrophenol	88755						
51	4-Nitrophenol	100027						
52	3-Methyl-4-Chlorophenol	59507	-					
53	Pentachlorophenol	87865	20 ***	13 ***	13	7.9	1000 *	29000 *
54	Phenol	108952					21 *	4600 *
55	2,4,6-Trichlorophenol	88062					1.2 †	3.6 †
56	Acenaphthene	83329					1200 *	2700 *
57	Acenaphthylene	208968					0.0028 †	0.0311 †
58	Anthracene	120127					0.0028 †	0.0311 †
59	Benzidine	92875					0.00012 *†	0.00054 *†
60	Benzo(a)Anthracene	56553					0.0028 †	0.0311 †
61	Benzo(a)Pyrene	50328					0.0028 †	0.0311 †
62	3,4-Benzofluoranthene	205992					0.0028 †	0.0311 †
63	Benzo(ghi)Perylene	191242					0.0028 †	0.0311 †
64	Benzo(k)Fluoranthene	207089					0.0028 †	0.0311 †
65	Bis(2-Chloroethoxy)Methane	111911						
66	Bis(2-Chloroethyl)Ether	111444					0.031 *†	1.4 *†
67	Bis(2-Chloroisopropyl)Ether	108601					1400 *	170000 *
68	Bis(2-Ethylhexyl)Phthalate	117817					1.8 *†	5.9 *†
69	4-Bromophenyl Phenyl Ether	101553						
70	Butylbenzyl Phthalate	85687					3000 *	5200 *
71	2-Chloronaphthalene	91587						
72	4-Chlorophenyl Phenyl Ether	7005723						
73	Chrysene	218019					0.0028 †	0.0311 †
74	Dibenz(a,h)Anthracene	53703					0.0028 †	0.0311 †
75	1,2-Dichlorobenzene	95501					2700 *	17000 *
76	1,3-Dichlorobenzene	541731					400	2600
77	1,4-Dichlorobenzene	106467					400	2600
78	3,3'-Dichlorobenzidine	91941					0.04 *†	0.077 *†
79	Diethyl Phthalate	84662					23000 *	120000 *
80	Dimethyl Phthalate	131113					313000	2900000
81	Di-n-Butyl Phthalate	84742					2700 *	12000 *
82	2,4-Dinitrotoluene	121142					0.11 †	9.1 †
83	2,6-Dinitrotoluene	606202						
84	Di-n-Octyl Phthalate	117840						
85	1,2-Diphenylhydrazine	122667					0.041 *†	0.54 *†
86	Fluoranthene	206440					42	54
87	Fluorene	86737					0.0028 †	0.031 †
88	Hexachlorobenzene	118741					0.00072 †	0.00074 †
89	Hexachlorobutadiene	87683					0.44 *†	50 *†

(#)	A COMPOUND	CAS Number	B FRESHWATER Criterion Maximum Conc. (ug/L) B1	B FRESHWATER Criterion Continuous Conc. (ug/L) B2	C SALTWATER Criterion Maximum Conc. (ug/L) C1	C SALTWATER Criterion Continuous Conc. (ug/L) C2	D HUMAN HEALTH (10^{-6} risk for carcinogens) For Consumption of: Water & Organisms (ug/L) D1	D HUMAN HEALTH (10^{-6} risk for carcinogens) For Consumption of: Organisms Only (ug/L) D2
90	Hexachlorocyclopentadiene	77474					242 *	17400 *
91	Hexachloroethane	67721					2.0 *†	8.9 *†
92	Indeno(1,2,3-cd)Pyrene	193395					0.0028 †	0.0311 †
93	Isophorone	78591					6900 *	490000 *
94	Naphthalene	91203	-					
95	Nitrobenzene	98953					17 *	1900 *
96	N-Nitrosodimethylamine	62759	-				0.00069 *†	8.1 *†
97	N-Nitrosodi-n-Propylamine	621647					0.005 *†	8.5 *†
98	N-Nitrosodiphenylamine	86306					5.0 *†	16 *†
99	Phenanthrene	85018					0.0028 †	0.0311 †
100	Pyrene	129000					0.0028 †	0.0311 †
101	1,2,4-Trichlorobenzene	120821						
102	Aldrin	309002	3 ‡		1.3 ‡		0.00013 *†	0.00014 *†
103	alpha-BHC	319846					0.0039 *†	0.013 *†
104	beta-BHC	319857					0.014 *†	0.046 *†
105	gamma-BHC	58899	2 ‡	0.08 ‡	0.16 ‡		0.019 †	0.063 †
106	delta-BHC	319868						
107	Chlordane	57749	2.4 ‡	0.0043 ‡	0.09 ‡	0.004 ‡	0.00058 *†	0.00059 *†
108	4-4'-DDT	50293	1.1 ‡	0.001 ‡	0.13 ‡	0.001 ‡	0.00059 *†	0.00059 *†
109	4,4'-DDE	72559					0.00059 *†	0.00059 *†
110	4,4'-DDD	72548					0.00083 *†	0.00083 *†
111	Dieldrin	60571	2.5 ‡	0.0019 ‡	0.71 ‡	0.0019 ‡	0.00014 *†	0.00014 *†
112	alpha-Endosulfan	959988	0.22 ‡	0.056 ‡	0.034 ‡	0.0087 ‡	0.93 *	2.0 *
113	beta-Endosulfan	33213659	0.22 ‡	0.056 ‡	0.034 ‡	0.0087 ‡	0.93 *	2.0 *
114	Endosulfan Sulfate	1031078					0.93 *	2.0 *
115	Endrin	72208	0.18 ‡	0.0023 ‡	0.037 ‡	0.0023 ‡	0.76 *	0.81 *
116	Endrin Aldehyde	7421934					0.76 *	0.81 *
117	Heptachlor	76448	0.52 ‡	0.0038 ‡	0.053 ‡	0.0036 ‡	0.00021 *†	0.00021 *†
118	Heptachlor Epoxide	1024573	0.52 ‡	0.0038 ‡	0.053 ‡	0.0036 ‡	0.00010 *†	0.00011 *†
119	PCB-1242	1336363		0.014 ‡		0.03 ‡	0.000044 *†	0.000045 *†
120	PCB-1254	11097691		0.014 ‡		0.03 ‡	0.000044 *†	0.000045 *†
121	PCB-1221	11104282		0.014 ‡		0.03 ‡	0.000044 *†	0.000045 *†
122	PCB-1232	11141165		0.014 ‡		0.03 ‡	0.000044 *†	0.000045 *†
123	PCB-1248	12672296		0.014 ‡		0.03 ‡	0.000044 *†	0.000045 *†
124	PCB-1260	11096825		0.014 ‡		0.03 ‡	0.000044 *†	0.000045 *†
125	PCB-1016	12674112		0.014 ‡		0.03 ‡	0.000044 *†	0.000045 *†
126	Toxaphene	8001352	0.73	0.0002	0.21	0.0002	0.00073 *†	0.00075 *†

* Criteria revised to reflect current agency q_1^* or RfD, as contained in the Integrated Risk Information System (IRIS).

** Freshwater aquatic life criteria for these metals are expressed as a function of total hardness (mg/L), as follows (where exp represents the base e exponential function). (Values displayed above correspond to a total hardness of 100 mg/L.)

$$CMC = \exp\{m_A[\ln(hardness)] + b_A\} \qquad CCC = \exp\{m_C[\ln(hardness)] + b_C\}$$

	m_A	b_A	m_C	b_C
Cadmium	1.128	-3.828	0.7852	-3.490
Copper	0.9422	-1.464	0.8545	-1.465
Chromium (III)	0.8190	3.688	0.8190	1.561
Lead	1.273	-1.460	1.273	-4.705
Nickel	0.8460	3.3612	0.8460	1.1645
Silver	1.72	-6.52		
Zinc	0.8473	0.8604	0.8473	0.7614

*** Freshwater aquatic life criteria for pentachlorophenol are expressed as a function of pH, and are calculated as follows. (Values displayed above correspond to a pH of 7.8.)

$$CMC = \exp(1.005(pH) - 4.830) \qquad CCC = \exp(1.005(pH) - 5.290)$$

† Criteria based on carcinogenicity (10^{-6} risk).

‡ Aquatic life criteria for these compounds were issued in 1980 utilizing the 1980 Guidelines for criteria development. The acute values shown are final acute values (fav) and according to the 1980 Guidelines the Acute values were intended to be interpreted as instantaneous maximum values, and the chronic values shown were interpreted as 24 - hour average values. EPA has not updated these criteria pursuant to the 1985 Guidelines. However, as an approximation, dividing the final acute values in columns B1 and C1 by 2 yields a Criterion Maximum Concentration. No numeric changes are required for columns B2 and C2, and EPA suggests using these values directly as Criterion Continuous Concentration.

GENERAL NOTES:

1) This chart lists all of EPA's priority toxic pollutants whether or not criteria recommendations are available.. Blank spaces indicate the absence of criteria recommendations.

2) The following chemicals have organoleptic based criteria recommendations that are not included on this chart (for reasons which are discussed in the preamble):

Copper	2,4-Dimethylphenol
Zinc	3-Methyl-4-Chlorophenol

3) For purposes of this rulemaking, freshwater criteria apply at salinity levels equal to or less than 5 parts per thousand (ppt); saltwater criteria apply at salinity levels greater than 5 ppt (0/00).

5/15/90