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DRAFT GUIDANCE

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EXECUTIVE SUMMARY

PURPOSE

The CERCLA Compliance with Other Environmental Laws Manual has been developed to provide guidance to Remedial Project Managers (RPMs), State personnel at State-lead Superfund sites, On-Scene Coordinators (OSCs), and other persons responsible for planning response actions under §§104, 106, and 122 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The guidance is intended to assist in the selection of on-site remedial actions that meet the applicable, or relevant and appropriate requirements (ARARs) of the Resource Conservation and Recovery Act (RCRA), Clean Water Act (CWA), Safe Drinking Water Act (SDWA), Clean Air Act (CAA), and other Federal and State environmental laws, as required by CERCLA §121.[1]

The manual has been developed for use by lead or support agencies for remedial actions. The lead agency may be either EPA or a State. For timely identification and to ensure compliance with ARARs, it is important to provide for early and continuous coordination between lead and support agencies throughout the remedy selection process.[2]

This manual will also be used by potentially responsible parties (PRPs) whenever they have the lead for identifying potential ARARs. In cases where potential ARARs are identified by the PRP, the actual ARARs will be decided by the lead agency. Further information concerning PRP involvement in the remedial investigation/feasibility study may be obtained from the "Interim Guidance on Potentially Responsible Party Participation in Remedial Investigations and Feasibility Studies." (April, 1988, OSWER Directive 9835.1A) or from the lead agency.

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[1] This volume covers requirements of RCRA, CWA, SDWA and ground-water protection policies. Another volume under development (Volume 3) will add requirements under the Clean Air Act and other environmental statutes.

[2] Specific EPA and State roles will be specified either in a Superfund Memorandum of Agreement (SMOA) or Cooperative Agreement (CA). The SMOA is a procedural agreement that outlines cooperative efforts between States and EPA Regions and defines the roles and responsibilities of each party in the conduct of a Superfund program in a State. For more information, see Draft Guidance on Preparing a Superfund Memorandum of Agreement (SMOA) (OSWER #9375.0-01). A Cooperative Agreement is a contractual agreement between the EPA and a State, in which the EPA provides money from the Fund to a State to conduct remedial action in compliance with the NCP.

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SCOPE

The requirements of §121 generally apply as a matter of law only to remedial actions. However, as a matter of policy, EPA will attain ARARs to the greatest extent practicable considering the exigencies of the situation at the site when carrying out removal actions. This manual may be used to assist OSCs in identifying potential ARARs for removal sites.

CERCLA §121 also requires on-site remedial actions to attain promulgated State ARARs that are more stringent than Federal ARARS. Specific issues related to identifying State ARARs will be addressed in a separate chapter at a later date.

Requirements for off-site actions are discussed to some extent in this manual. For a more detailed discussion of off-site requirements, the reader should consult "Revised Procedures for Planning and Implementing Off-Site Response Actions" (issued November 13, 1987, EPA Directive 9834.11).

CERCLA defines situations in which the use of ARARs may be waived in particular circumstances. Waivers are described in this manual. Further guidance on the use of waivers may be added at a later date.

The manual is intended to be used in conjunction with other EPA guidance documents, including the following:

- Draft Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA (May 1988, OSWER Directive 9335.3-01);
- Superfund Public Health Evaluation Manual (October 1986, OSWER Directive 9285.4-1);
- Draft Guidance on Preparing Superfund Decision Documents: The Proposed Plan and Record of Decision (March 1988, OSWER Directive 9355.3-02);
- Draft Guidance on the Administrative Record for SARA Response Actions (November 1986, OSWER Directive 9833.1A);
- Interim Guidance on Potentially Responsible Party Participation in Remedial Investigations and Feasibility Studies (April 1988, OSWER Directive 9835.1A); and
- Draft Guidance on Remedial Actions for Contaminated Ground Water at Superfund sites. (No date, OSWER Directive 9283.1-02).

CONTENTS

Chapters 1 and 2 of the manual discuss the overall procedures for identifying ARARs and provide guidance on the interpretation and analysis of RCRA requirements. Chapter 1 defines "applicable" and "relevant and appropriate," provides matrices listing potential chemical-specific, location-specific, and action-specific requirements from RCRA, the Clean Water Act, and the Safe Drinking Water Act, and provides general procedures for identifying and analyzing requirements. Chapter 2 discusses special issues of interpretation and analysis involving RCRA requirements, and provides guidance on when RCRA requirements will be ARARs for CERCLA remedial actions. Chapter 3 provides guidance for compliance with Clean Water Act substantive (for on-site and off-site actions) and administrative (for off-site actions) requirements for direct discharges, indirect discharges, and dredge and fill activities. Chapter 4 provides guidance for compliance with requirements of the Safe Drinking Water Act that may be applicable or relevant and appropriate to CERCLA sites. Chapter 5 provides guidance on consistency with policies for ground-water protection. The manual also contains a hypothetical scenario illustrating how applicable or relevant and appropriate requirements are identified and used, and an appendix summarizing the provisions of RCRA, the CWA and SDWA.

KEY POINTS

Definition 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 whether a given requirement is applicable; then, if it is not applicable, a determination whether it is nevertheless both relevant and appropriate.

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 cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under Federal or State law that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site.

The determination that a requirement is relevant and appropriate is a two-step process: (1) determination if a requirement is relevant and (2) determination if a requirement is appropriate. In general, this involves

a comparison of a number of site-specific factors, including the characteristics of the remedial action, the hazardous substances present at the site, or the physical circumstances of the site, with those addressed in the statutory or regulatory requirement. In some cases, a requirement may be relevant, but not appropriate, given site-specific circumstances; such a requirement would not be ARAR for the site. In addition, there is more discretion in the determination of relevant and appropriate; it is possible for only part of a requirement to be considered relevant and appropriate in a given case. When the analysis results in a determination that a requirement is both relevant and appropriate, such a requirement must be complied with to the same degree as if it were applicable.

To-be-Considered Material (TBCs) are non-promulgated advisories or guidance issued by Federal or State government that are not legally binding and do not have the status of potential ARARs. However, as described below, in many circumstances TBCs will be considered along with ARARs as part of the site risk assessment and may be used in determining the necessary level of cleanup for protection of health or the environment.

Types of ARARs

There are several different types of requirements that CERCLA actions may have to comply with. The classification of ARARs below was developed to provide guidance on how to identify and comply with ARARs; however, some requirements may not fall neatly into this classification system.

- Ambient or chemical-specific requirements are usually health- or risk-based numerical values or methodologies which, when applied to site-specific conditions, result in the establishment of numerical values. These values establish the acceptable amount or concentration of a chemical that may be found in, or discharged to, the ambient environment.

- Performance, design, or other action-specific requirements are usually technology- or activity-based requirements or limitations on actions taken with respect to hazardous wastes.

- Location-specific requirements are restrictions placed on the concentration of hazardous substances or the conduct of activities solely because they occur in special locations.

Developing Protective Remedies Using Risk Assessment, ARARs, and TBCs

CERCLA §121 requires selection of a remedial action that is protective of human health and the environment. EPA's approach to determining protectiveness involves risk assessment, considering both ARARs and to-be-considered materials (TBCs). The risk assessment includes consideration of site-specific factors such as types of hazardous substances present, potential for exposure, and presence of sensitive populations. Acceptable exposure levels are generally determined by applicable or relevant and appropriate

Federal and State environmental requirements, if available, and the following factors: (1) for systemic toxicants, concentration levels to which the human population (including sensitive subgroups) could be exposed on a daily basis without appreciable risk of significant adverse effects during a lifetime; (2) for known or suspected carcinogens, concentration levels that represent an excess upperbound lifetime cancer risk to an individual of between 10^{-4} and 10^{-7}; (3) other factors related to exposure (such as multiple contaminants at a site or multiple exposure pathways) or to technical limitations (such as detection/quantification limits for contaminants). The Superfund Public Health Evaluation Manual provides guidance on determining acceptable levels.[3]

ARARs will define the cleanup goals when they set an acceptable level with respect to site-specific factors.. For example, MCLs under the Safe Drinking Water Act are normally acceptable levels for specific contaminants. However, cleanup goals for some substances may have to be based on non-promulgated criteria and advisories (for example, health advisories such as reference doses (RfD)) rather than on ARARs because ARARs do not exist for those substances or because an ARAR alone would not be sufficiently protective in the given circumstances, e.g., where additive effects from several chemicals are involved. In these situations, the cleanup requirements, in order to meet the cleanup goals, will not be based on ARARs alone but also on TBCs. Similarly, State criteria, advisories, and guidance should also be considered for the State in which a site is located.

Using ARARs

Different ARARs that may apply to a site and its remedial action should be identified at multiple points in the remedy selection process. During the scoping of the RI/FS and the site characterization phase, the lists of potential ARARs in Exhibits 1-1, 1-2, and 1-9 and the appropriate Regional or State program office should be consulted to determine what ARARs may apply to the site. At this stage potential chemical- and location-specific ARARs should be identified. Exhibits 1-3 and 1-9 and the appropriate Regional or State program office should be consulted in identifying action-specific ARARs for each proposed alternative during the development of remedial alternatives in the Feasibility Study. During the detailed design the technical specifications must ensure attainment of ARARs.

When and Where Protectiveness Must Be Attained

ARARs (and TBCs necessary for protection) must be attained for hazardous substances, pollutants, or contaminants remaining on-site at the completion of the remedial action, unless waiver of an ARAR is justified. In addition, EPA intends that the implementation of remedial actions should also comply with ARARs (and TBCs as appropriate) to protect public health and the environment.

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[3] Superfund Public Health Evaluation Manual, OSWER Directive 9285.4-1, October, 1986.

ARARs (and TBCs necessary for protection), pertaining both to contaminant levels and to performance or design standards, should generally be attained at all points of potential exposure, or at the point specified by the ARAR itself. CERCLA requires, to the maximum extent practicable, the use of permanent solutions and alternative treatment technologies. Any waste left in place should either be brought to health-based levels or managed according to performance or design specifications. At sites where a TBC value is used to set a protective level of cleanup or where the ARAR does not specify the point of compliance, there is discretion to determine where the requirement shall be attained to ensure protectiveness. At each potential point of exposure, a reasonable maximum exposure scenario should be assumed, and cleanup goals set accordingly to ensure protectiveness, using best professional judgment. Restrictions on use or access should not be a substitute for remediation to appropriate protective health-based or design levels. If active measures are not practicable (or cost-effective), exposure to the waste must be controlled through legally enforceable institutional means. "Non-engineered" or "exposure" controls may be used in certain circumstances in combination with "engineered" controls and/or treatment in the management and cleanup of the site where it is determined that such controls are necessary to be protective. In such circumstances, where exposure controls are used, restrictions should be employed to ensure that the controls remain in place, that they remain protective, and that they are effective in preventing exposure to hazardous substances for as long as the substances at the site remain hazardous.

In ground water, cleanup goals should generally be attained throughout the contaminated plume, or at the edge of the waste management area when waste is left in place. However, if the waste is left on-site under a hybrid-type closure scenario (see p. 2-20 for discussion of hybrid closure), where the waste does not threaten ground water, the goal should be to reach health-based levels underneath the waste as well.

In surface water, cleanup goals should generally be attained at the point or points where the release enters the surface water. In air, cleanup goals should generally be achieved at the maximum exposed individual, considering the reasonably expected uses of the site and surrounding area. For soils, cleanup goals should generally be attained wherever direct contact might reasonably occur.

Compliance with Substantive and Administrative Requirements

CERCLA §121(e) exempts any response action conducted entirely on-site from having to obtain a Federal, State, or local permit, where the action is carried out in compliance with §121.

In general, on-site actions need comply only with the substantive aspects of ARARs, not with the corresponding administrative requirements. That is, permit applications and other administrative procedures, such as administrative reviews and reporting and recordkeeping requirements, are not considered ARARs for actions conducted entirely on-site. However, the

Feasibility Study, the Proposed Plan, the Record of Decision, the Community Relations Plan, and the Administrative Record should demonstrate full compliance with all substantive requirements that are ARARs, unless a waiver is used.

Off-site actions must comply with all legally applicable requirements, both substantive and administrative. The concept of "relevant and appropriate" is not available for off-site actions.

Coordination/Consultation With Other Federal and State Programs

Sources of potential ARARs include other Federal environmental laws administered by EPA and authorized States and by other Federal agencies, and more stringent State environmental or facility siting laws. Therefore, to ensure that remedies comply with substantive aspects of identified ARARs, other Federal and State program offices should be consulted as appropriate, particularly for on-site actions where no permit will be obtained.

RCRA Requirements

Prerequisites for Applicability of RCRA Hazardous Waste Management Regulations

RCRA requirements for treatment, storage, or disposal of hazardous wastes apply to a Superfund site if the site contains RCRA listed or characteristic hazardous waste that was treated or disposed of after the effective date of the RCRA regulations that are under consideration as potential ARARs for the site, or if the CERCLA activity at the site constitutes current treatment, storage, or disposal of RCRA hazardous waste. In some cases, it may not be possible to determine whether a CERCLA hazardous substance at a site is a hazardous waste under RCRA, or whether it was disposed at the site after the effective date; these prerequisites should not be assumed. In such cases, RCRA requirements will not be applicable, but may nevertheless be relevant and appropriate, if the CERCLA action involves treatment, storage, or disposal and if the wastes are similar or identical to RCRA hazardous waste.

Definition of Disposal

EPA has concluded that moving RCRA hazardous waste (including hazardous waste that was originally disposed before the requirements' effective date) constitutes land disposal when that waste is placed into a land disposal unit. At CERCLA sites, there are areas of contamination with differing levels of concentration of hazardous substances, pollutants, or contaminants. In such cases, when RCRA hazardous waste is moved into an area of contamination, RCRA disposal requirements (such as for closure) are applicable to the area where the waste is received. In addition, EPA has determined that disposal and placement are synonymous for purposes of determining the applicability of the land disposal restrictions under RCRA.

Corrective Action

RCRA contains several authorities under which corrective action requirements will be promulgated.[4] Because of the similarity of corrective action under RCRA to CERCLA cleanup, these requirements are likely to be applicable or relevant and appropriate in many remedial action situations. This manual will be updated to include RCRA corrective action requirements and their bearing on CERCLA remedial activities.

Ground-water Protection

RCRA currently contains ground-water monitoring and protection standards. In general, EPA will use MCLs as protection levels for ground water that is currently or potentially used for drinking. The Agency may establish site-specific exposure-based ACLs at particular sites where the ground water cannot be used for drinking because of high salinity or naturally occurring widespread contamination, or where cleanup is not practicable or cost-effective and where the circumstances fulfill the conditions of CERCLA §121(d)(B)(ii).

The Superfund Program's goal is to restore ground water to its beneficial uses based in large part on their vulnerability, use, and value. The Ground-Water Protection Strategy and draft Office of Ground-Water Protection Classification Guidelines serve as useful guidance. The program uses the classification scheme on a site-specific basis to assist in the characterization of a ground water's vulnerability, use, and value. Ground-water classifications performed at Superfund sites are limited in scope to the Superfund action that will be taken and do not apply to the geographical area in general. More stringent promulgated State requirements will be used as standards when they exist. Additional guidance on Clean Water Act, Safe Drinking Water Act, and other water-related requirements is presented in Chapters 3, 4, and 5 of this manual.

Clean Water Act Requirements

Direct Discharge to Surface Waters

Both on-site and off-site direct discharges from CERCLA sites to surface waters are required to meet the substantive requirements of the National Pollutant Discharge Elimination System (NPDES) program. These substantive requirements include discharge limitations (both technology and water quality based), certain monitoring requirements, and best management practices. These requirements will be contained in an NPDES permit for off-site CERCLA

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[4] Corrective action requirements for regulated units have been promulgated in 40 CFR Part 264, Subpart F. Additional requirements for corrective action for solid waste management units (SWMUs) at RCRA facilities seeking permits are currently being developed for promulgation in 40 CFR Part 264 Subpart S.

discharges. For on-site direct discharges from a CERCLA site, these substantive requirements must be identified and complied with even though on-site discharges are not required to have an NPDES permit. For purposes of this guidance, a direct discharge of CERCLA wastewaters would be "on-site" if the receiving water body is in the area of contamination or is in very close proximity to the site and necessary for implementation of the response action (even if the water body flows off-site).

Indirect Discharge to POTWs

In general, the discharge of CERCLA wastewaters to publicly owned treatment works (POTWs) is considered an off-site activity. Therefore, CERCLA responses are required to comply with all applicable (both substantive and administrative) requirements of the national pretreatment program including the general and specific discharge prohibitions. Further, all local pretreatment regulations must be complied with before discharging wastewater to a POTW. These local pretreatment regulations include local discharge limitations and prohibitions. When considering discharge of CERCLA wastewater to a POTW, the POTW's record of compliance with the NPDES permit and pretreatment program requirements should be assessed.

Discharge of Dredged or Fill Material

Under CERCLA §121(e), no Federal, State, or local permit is required for response actions conducted entirely on-site; however, consultation with the Corps remains important in developing the CERCLA response. Under the CWA §404 guidelines, no discharge of dredged or fill material will be allowed unless appropriate and practicable steps are taken that minimize potential adverse impacts of the discharge on the aquatic ecosystem.

Safe Drinking Water Act Requirements

Use of MCLs

For cleaning up ground water or surface water that is or may be used for drinking, the Maximum Contaminant Levels (MCLs) set under the Safe Drinking Water Act are generally the applicable or relevant and appropriate standard. MCLs are applicable where the water will be provided directly to 25 or more people or will be supplied to 15 or more service connections. When MCLs are applicable, they should at least be met at the tap. MCLs are relevant and appropriate in other cases where surface water or ground water is or may be directly used for drinking water, and in such cases, the MCLs should be met in the surface water or groundwater itself.

Use of MCLGs

A standard for drinking water more stringent than an MCL may be needed in special circumstances, such as where multiple contaminants in groundwater or multiple pathways of exposure present extraordinary risks (i.e., individual lifetime cancer risk above 10^{-4}). In setting a level more stringent than the

MCL in such cases, a site-specific determination should be made by considering Maximum Contaminant Level Goals (MCLGs), the Agency's policy on the use of appropriate risk ranges for carcinogens, levels of quantification, and other pertinent guidelines. Prior consultation with Headquarters contacts in the Office of Emergency and Remedial Response or the Office of Waste Programs Enforcement, as appropriate, is encouraged in such cases.

Underground Injection Control Program

CERCLA sites where underground injection wells are constructed on-site are not required to comply with the administrative requirements of the UIC program. However, they must meet the substantive requirements that are determined to be applicable or relevant and appropriate to the CERCLA remedial action. Examples of substantive UIC program requirements include RCRA manifest and corrective action requirements for the underground injection of hazardous wastes, well construction requirements, well operating requirements, and well closure requirements. Other information should also be reported to the Region UIC program regarding the operation of an injection well. (This information is described in Chapter 4).

CHAPTER 1

GENERAL PROCEDURES FOR CERCLA COMPLIANCE WITH OTHER STATUTES

1.0 INTRODUCTION

This chapter describes general procedures for Superfund compliance with applicable or relevant and appropriate requirements (ARARs) of other environmental and public health statutes when conducting remedial actions. Currently, the most important requirements for compliance are set by the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) itself, as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), particularly §121. The current National Contingency Plan (NCP)[1] and the "Memorandum on CERCLA Compliance with Other Environmental Laws" (the Compliance Policy), which was published as an appendix to the November 1985 NCP Preamble, remain in effect regarding cleanup standards except when superceded by the new CERCLA requirements. However, because the NCP is being revised, it is generally not described in this chapter, which is organized as follows:

Section 1.1 provides an overview of the statutory requirements concerning CERCLA compliance with other laws.

Section 1.2 describes general procedures for identifying particular requirements in other laws that may be applicable or relevant and appropriate requirements (ARARs) for a CERCLA remedial action. In order to facilitate identification of ARARs, Section 1.2 provides matrices of chemical-specific, location-specific, and action-specific potential ARARs from several different laws. Finally, Section 1.2 provides a procedure for analyzing the probable ARARs to determine whether they are, in fact, applicable or relevant and appropriate requirements for the particular site in question.

Section 1.3 provides a short description of the situations listed in CERCLA that may justify waiving particular requirements that have been determined to be ARARs. More detailed guidance on waivers will be provided at a later date.

Section 1.4 describes how materials that are not potential ARARs, but which do provide useful guidance or information, should be considered, analyzed, and used.

Section 1.5 provides guidance on documenting the consideration of ARARs in developing remedial actions.

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[1] See 40 CFR Part 300.

1.1 OVERVIEW OF REQUIREMENTS CONCERNING CERCLA COMPLIANCE WITH OTHER LAWS

CERCLA, as it was passed in 1980, did not contain a specific requirement pertaining to the compliance of on-site CERCLA actions with other laws. CERCLA §105, which authorizes EPA to prepare the National Contingency Plan (NCP) for hazardous substance response, says only that the NCP shall include "methods and criteria for determining the appropriate extent of removal, remedy, and other measures." EPA, however, stated in the NCP (as revised in 1985)[2] and in its policy memorandum on CERCLA compliance with other environmental statutes, which was attached to the preamble to the 1985 NCP, that it would attain or exceed applicable or relevant and appropriate Federal environmental and public health standards in CERCLA response actions unless one of five specifically enumerated situations was present.

CERCLA §121, added by Congress in SARA in 1986, in effect codifies EPA's existing approach to compliance with other laws. Section 121 establishes cleanup standards for remedial actions under §§104 and 106 of CERCLA. Remedial actions must attain a general standard of cleanup that assures protection of human health and the environment, must be cost effective, and must use permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, for any material remaining on-site,[3] the level or standard of control that must be met for the hazardous substance, pollutant, or contaminant is at least that of any applicable or relevant and appropriate standard, requirement, criteria, or limitation under any Federal environmental law, or any more stringent standard, requirement, criteria, or limitation promulgated pursuant to a State environmental statute.[4]

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[2] 40 CFR §300.68 (50 FR 47969, November 20, 1985).

[3] CERCLA §121(c)(3)(B) requires off-site storage, destruction, treatment, or secure disposition of hazardous substances from Superfund sites to be carried out only at hazardous waste disposal facilities that are in compliance with Subtitle C of RCRA. CERCLA §121(d)(3) requires that transfer of hazardous substances be made only to facilities that are operating in compliance with §§3004 and 3005 of the Solid Waste Disposal Act (or, where applicable, in compliance with the Toxic Substances Control Act or other applicable Federal law) and all applicable State requirements. Requirements for off-site actions are discussed to some extent in this manual. For more detailed discussion of off-site requirements, the reader should consult "Revised Procedures for Planning and Implementing Off-site Response Actions (issued November 13, 1987, EPA Directive 9834.11).

[4] Applicable or relevant and appropriate requirements include more stringent currently promulgated State requirements (See CERCLA §121 (d)(2)(A)(ii)). The proposed NCP will define "promulgated" State requirements as those laws or regulations that are of general applicability and are legally enforceable. Coordination with State governments to identify State ARARs will be addressed at a later date.

Congress added several new categories of potential ARARs, particularly State standards, which the NCP had previously included in the category of requirements to be considered, but not necessarily attained. In addition, remedial actions are now required by §121 to at least attain levels or standards of control established by Maximum Contaminant Level Goals under the Safe Drinking Water Act and Federal Water Quality Criteria under the Clean Water Act, when those standards or goals are relevant and appropriate under the circumstances of the release.[5] Section 121 also establishes special requirements for the use of alternate concentration limits.

CERCLA §121(e) provides that no Federal, State, or local permit shall be required "for the portion of any removal or remedial action conducted entirely on site," when the action is selected and carried out in compliance with the cleanup standards requirements in §121. EPA interprets "on-site" to include the "areal extent of contamination and all suitable areas in very close proximity to the contamination necessary for implementation of the response action." As a matter of policy, this definition would be implemented with certain limitations. Generally, best professional judgment should be used to determine that the area is within "very close proximity" to the contamination and is necessary for implementation of the portion of the response action addressing the nearby contamination.[6]

Finally, §121(d)(4) provides that under six specific circumstances, described below, legally applicable or relevant and appropriate requirements can be waived. However, the requirement that the remedy be protective of human health and the environment cannot be waived.

ARARs and Removal Actions

The requirements of CERCLA §121 generally apply as a matter of law only to remedial actions. EPA's policy for removal actions, however, is that ARARs will be identified and attained to the extent practicable. This manual may be used as a reference by On-Scene Coordinators (OSCs) to assist in identifying potential ARARs for removal sites. Three factors will be applied to determine whether the identification and attainment of ARARs is practicable in a particular removal situation: (1) the exigencies of the situation; (2) the scope of the removal action to be taken; and (3) the effect of ARAR attainment on the statutory limits for removal action duration and cost. These factors are outlined below.

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[5] Details concerning these categories of standards are provided in section 1.2.3.1 below. CERCLA §121(d)(2)(B)(i) lists four factors that must be considered in determining whether or not any water quality criteria under the Clean Water Act are relevant and appropriate.

[6] Federal, State, or potentially responsible parties undertaking removal or remedial actions under CERCLA §§104, 106, or 122 are covered by the §121(e) permit exemption.

Exigencies of the situation. OSCs must often act quickly to provide protection of public health and the environment and any delay would compromise this objective of the removal action. Where urgent conditions constrain or preclude efforts to identify and attain ARARs, the OSC's documentation of these conditions will be considered sufficient as justification for not attaining all ARARs. To illustrate, a site may contain leaking drums that pose a danger of fire or explosion in a residential area. The drums should be removed or stabilized immediately, without attempting to identify and comply with all potential ARARs. The OSC's documentation should describe the time-critical nature of the situation and the remedial action taken.

Scope of the removal action. Removal actions generally focus on the stabilization of a release or threat of release and mitigation of near-term threats. ARARs that are within the scope of such removal actions, therefore, are only those ARARs that must be attained in order to eliminate the near-term threats. For example, a removal action may be conducted to remove large numbers of leaking drums and associated contaminated soil. In this situation, because the removal focuses only on partial control, chemical-specific ARARS for groundwater restoration would not be considered.

Statutory limits. CERCLA sets time and money limitations on a removal action. Attainment of all ARARs for a removal response may not be possible within the 12 months or $2 million limits set in the statute. For instance, a removal action may be undertaken at a site where there is widespread soil and ground water contamination. This response might involve removal of surface debris and excavation of highly-contaminated soil necessary to reduce the direct contact threat and further deterioration of the ground water. If the statutory limits were reached or approached as a result of the debris removal and limited excavation, more extensive excavation of low-level soil contamination as part of the removal action may not be warranted. Although the statutory limits may preclude removals from attaining all identified ARARs, OSCs will give greater emphasis to those ARARs that are most crucial to the proper stabilization of the site and protection of public health and the environment. (Exemptions to the $2 million/12 month statutory limits may be granted where sites meet the criteria for approving the "emergency" or "consistency" exemptions.)

In addition to the three factors for determining whether it is practicable to identify and attain ARARs for removal actions, the statutory waivers in CERCLA §121(d)(4) would apply to removal as well as to remedial actions. For example, State ARARs do not have to be attained where the State standard, requirement, criterion, or limitation has not been consistently applied in circumstances similar to the response in question. If a State standard is identified as an ARAR for a removal action, attainment of that ARAR may be waived if the State has inconsistently applied it in similar circumstances. The ARARs waivers generally may be used as they are used for remedial activities.

Developing Protective Remedies Using Risk Assessment, ARARs, and TBCs

CERCLA §121 requires selection of a remedial action that is protective of human health and the environment. EPA's approach to determining protectiveness involves risk assessment, considering both ARARs and to-be-considered materials (TBCs). The risk assessment includes consideration of site-specific factors such as types of hazardous substances present, potential for exposure, and presence of sensitive populations. Acceptable exposure levels are generally determined by applicable or relevant and appropriate Federal and State environmental requirements, if available, and the following factors: (1) for systemic toxicants, concentration levels to which the human population (including sensitive subgroups) could be exposed on a daily basis without appreciable risk of significant adverse effects during a lifetime; (2) for known or suspected carcinogens, concentration levels that represent an excess upperbound lifetime cancer risk to an individual of between 10^{-4} and 10^{-7}; (3) other factors related to exposure (such as multiple contaminants at a site or multiple exposure pathways) or to technical limitations (such as detection/quantification limits for contaminants). The Superfund Public Health Evaluation Manual provides guidance on determining acceptable levels.[7]

1.2 GENERAL PROCEDURES FOR DETERMINING IF REQUIREMENT IS APPLICABLE OR RELEVANT AND APPROPRIATE

CERCLA §121 requires, for hazardous substances left on-site at the conclusion of remedial actions, that the action require a level or standard of control which at least attains applicable or relevant and appropriate Federal or State environmental or public health requirements, except in certain limited circumstances. A requirement is applicable if the specific terms (or "jurisdictional prerequisites") of the law or regulation directly address the circumstances at a site. If not applicable, a requirement may nevertheless be relevant and appropriate if circumstances at the site are, based on best professional judgment (BPJ), sufficiently similar to the problems or situations regulated by the requirement.

Exhibit 1-9 to this chapter lists the universe of ARARs,[8] without reference to particular situations where they may apply. Exhibits 1-1, 1-2, and 1-3 of this chapter list potential chemical-specific, location-specific, and action-specific ARARs, respectively; these potential ARARs should be analyzed to determine ARARs for a specific CERCLA site.

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[7] Superfund Public Health Evaluation Manual, OSWER Directive 9285.4-1, October, 1986.

[8] EPA has identified a comprehensive list of statutory and regulatory requirements from which potential ARARs for a particular CERCLA site may be drawn. While every effort has been made to develop a complete list, some requirements, such as those recently promulgated, may not be included.

Because of the varied and unpredictable situations at CERCLA sites, EPA cannot specify in advance which requirements will be ARAR for each site. Applicable or relevant and appropriate requirements must be identified in connection with the characteristics of the particular site, the substances at the site, and the remedial action alternatives that are suggested by the circumstances of the site. In order to identify ARARs correctly and in a timely manner for on-site actions where permits are not required, each EPA Region should establish procedures, protocols, or memoranda of understanding to ensure early and continuous cooperation and coordination with Regional Superfund staff, appropriate Regional and State offices and other Federal agencies. These procedures should not recreate the administrative and procedural aspects of the permit process, but should ensure that all substantive requirements are attained. Section 3.2.4 of this Compliance Manual addresses key areas for recommended coordination between Superfund and Water Offices, and includes a detailed discussion that may be adopted as needed for other environmental laws.

The diagram on p. 1-7 provides an overview of critical points for identification of ARARs and for communication/coordination with other EPA offices, States, and other Federal agencies as appropriate to identify and ensure compliance with ARARs. Superfund staff should also consider Federal and State environmental and public health criteria, advisories, guidance, and proposed standards ("to-be-considered" materials, or TBCs). TBCs will be evaluated along with ARARs as part of the risk assessment conducted for each CERCLA site, and may be used to set protective cleanup level targets.

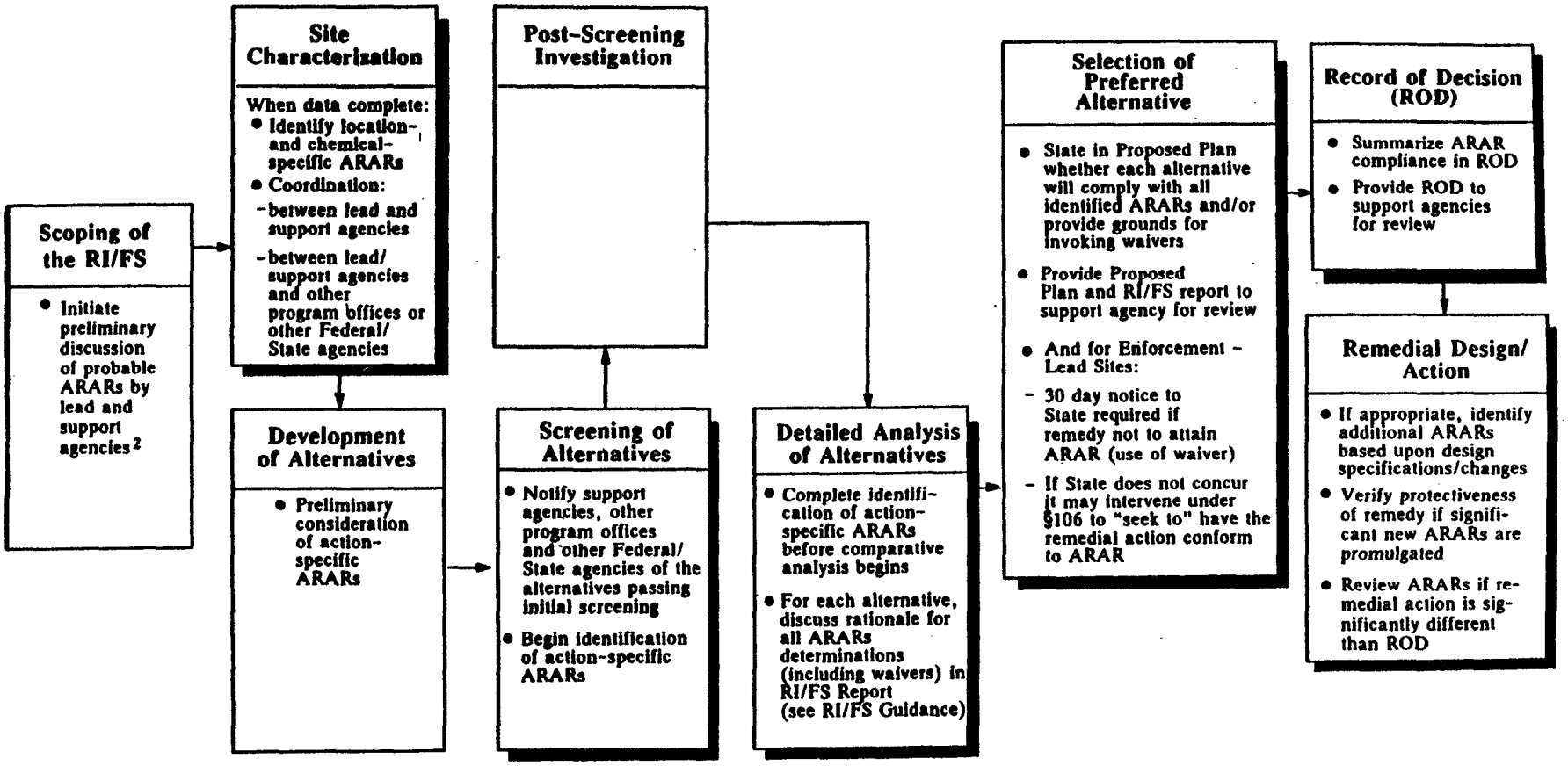
Coordination between CERCLA (Superfund) and other Program Offices

In order to identify ARARs correctly and in a timely manner, each EPA Region should establish procedures, protocols or memoranda of understanding that, while not recreating the administrative aspects of a permit, ensure early and continuous cooperation and coordination between the Regional Superfund and other program offices. In addition, State Superfund and other program offices may be involved where there is a State-lead action or where the State has been delegated authority under the Clean Water Act or under the Resource Conservation and Recovery Act. Other Federal agencies may assist in ARARs determination for laws which they administer, e.g., the Endangered Species Act. Coordination among all appropriate offices should be established. Such coordination will be particularly important for on-site actions where no Federal, State, or local permit is required.

The process of identifying ARARs for remedial actions essentially begins after the site characterization (during the remedial investigation) and may continue through the remedial design phase. ARARs are identified in increments of increasing certainty as more information regarding the site is developed. The appropriate scope and extent of each Region's coordination procedures for identifying ARARs should be determined by the Region. It is recommended that the description of roles and responsibilities should identify those steps in the Superfund remedy selection process where coordination will occur and the level of involvement anticipated for each of these steps (e.g., written comments at certain stages, routing procedures, and agreement as

Points Where ARARs are Identified and Communicated[1]

Remedial Investigation:



Feasibility Study:

[1] *This chart highlights critical points for communication between lead and support agencies in identifying ARARs and TBCs. As noted, EPA and the State should provide opportunities for consultation with other Federal/State program offices, and with other Federal/State agencies as appropriate to assist in identification of ARARs: The Region or State may determine that the RI/FS report, Proposed Plan, or ROD should be shared with other EPA/State program offices or other Federal agencies. In general, Federal and State agencies should assume responsibility for coordinating the involvement of their respective program offices and other agencies in developing information on ARARs. The appropriate procedures for such consultation should be developed by EPA Regional offices and by the Federal and State programs/agencies respectively.*

[2] *Copies of draft and final RI/FS workplan sent to other EPA/State offices as appropriate.*

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to what constitutes timely notification and timely response between Superfund and other Regional and State program offices, and other Federal agencies).

1.2.1 WHERE AND WHEN ARARs SHOULD BE ATTAINED

ARARs (and materials "to be considered" for protectiveness -- TBCs) must be attained for hazardous substances remaining on-site at the completion of the remedial action. In addition, EPA intends that the implementation of remedial actions should also comply with ARARs (and TBCs as appropriate) to protect public health and the environment. All remedial actions should attain action-specific requirements that have been identified as ARAR while the remedial action is being conducted, unless a waiver is justified. However, if ARARs are not being met before the commencement of a remedial action, it is not necessary to invoke a waiver to justify their non-attainment during the action.

Generally, EPA's policy is to attain ARARs (and TBCs necessary for protection) pertaining either to contaminant levels or to performance or design standards to ensure protection at all points of potential exposure. At sites where a TBC value is used to set a protective level of cleanup or where the ARAR does not specify the point of compliance, there is discretion to determine where the requirement shall be attained to ensure protectiveness. At each potential point of exposure, a reasonable maximum exposure scenario should be assumed, and cleanup goals set accordingly to ensure protectiveness, using best professional judgment. Restrictions on use or access should not be a substitute for remediation to appropriate protective health-based or design levels. If active measures are not practicable (or cost-effective), exposure to the waste must be controlled through legally enforceable institutional means. "Non-engineered" or "exposure" controls may be used in certain circumstances in combination with "engineered" controls and/or treatment in the management and cleanup of the site where it is determined that such controls are necessary to be protective. In such circumstances, where exposure controls are used, restrictions should be employed to ensure that the controls remain in place, that they remain protective, and that they are effective in preventing exposure to hazardous substances for as long as the substances at the site remain hazardous. Any waste left in place should either be brought to health-based levels or managed according to performance or design specifications.

For ground water, remediation levels should generally be attained throughout the contaminated plume, or at and beyond the edge of the waste management area when waste is left in place. For air, the selected level(s) should be established for the maximum exposed individual, considering reasonably expected use of the site and surrounding area. For surface waters, the selected level(s) should be attained at the point or points where the release enters the surface waters.

1.2.1.1 Requirements for Handling of Investigation-Derived or Laboratory Wastes

The handling, treatment, or disposal of investigation-derived wastes produced during remedial activities such as the Site Investigation (SI) or Remedial Investigation/Feasibility Study (RI/FS) must be carried out in compliance with Federal and State ARARs. Field investigation teams should use best professional judgment in determining when investigation-derived wastes may contain hazardous wastes in hazardous amounts, and should handle such wastes in accordance with all Federal and State ARARs.[9] Similarly, if the hazards of investigation-derived wastes are not known, EPA expects that field investigation teams will make a reasonable effort to comply with all requirements that may be relevant and appropriate, as necessary to protect public health and the environment.[10]

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[9] Specifically, there are several ways that investigation-derived wastes may result from such remedial activities: (1) ground water or surface water samples that must be disposed of after analysis; (2) drill cuttings or core samples from soil boring or monitoring well installations; (3) purge water removed from sampling wells before ground water samples are collected; (4) water, solvents, or other fluids used to decontaminate field equipment such as backhoes, drilling rigs, and pipes; (5) condensation from pipes used for gas sampling in landfills; and (6) waste produced by on-site pilot-scale facilities constructed to test technologies best suited for remediation of the site. Note that the activities conducted as part of the Superfund Innovative Technologies Evaluation (SITE) program under CERCLA §311(b) are not response actions and therefore are not required to comply with ARARs. Nonetheless, in order to ensure protection of human health and the environment, SITE demonstration projects taking place at Superfund sites should comply with the substantive requirements of all applicable or relevant and appropriate Federal and State environmental laws unless a waiver is justified.

[10] The handling, treatment, or disposal of any such investigation-derived wastes must satisfy Federal and State requirements that are applicable or relevant and appropriate to the site location and the amount and concentration of the hazardous substances, pollutants, or contaminants involved. For example, if ground water samples containing hazardous substances are to be disposed of by discharge into surface water, they may require treatment before disposal so that water quality standards are not violated. Also, if it is known or suspected that purge waters are drawn from an area with significant dioxin contamination, such investigation-derived wastes should be containerized, tested, and disposed of in accordance with all ARARs. (Consistent with established practice, investigation-derived materials may remain on-site until the remedial action commences.) In contrast, the routine placement in containers of large volumes of drilling muds and purge waters which are not suspected to contain hazardous substances may be unnecessary because they result only in delays to investigation with no attendant public health or environmental benefit.

1.2.2 DEFINITIONS OF APPLICABLE AND RELEVANT AND APPROPRIATE

The following definitions of "applicable" and "relevant and appropriate" will be proposed in the new NCP and retain the essential features of definitions in the current NCP:

> Applicable requirements means 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.

"Applicability" implies that the remedial action or the circumstances at the site satisfy all of the jurisdictional prerequisites of a requirement. For example, the minimum technology requirement for landfills under RCRA would apply if a new hazardous waste landfill unit or a lateral expansion of an existing unit as defined[11] were to be built on a CERCLA site.

If a requirement is not applicable, one must consider whether it is both relevant and appropriate.

> Relevant and appropriate requirements means those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under Federal or State law that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site. However, in some circumstances, a requirement may be relevant but not appropriate for the site-specific situation.

The determination that a requirement is relevant and appropriate is a two-step process: (1) determination if a requirement is relevant and (2) determination if a requirement is appropriate. In general, this involves a comparison of a number of site-specific factors, including the characteristics of the remedial action, the hazardous substances present at the site, or the physical circumstances of the site, with those addressed in the statutory or regulatory requirement. In some cases, a requirement may be relevant, but not appropriate, given site-specific circumstances; such a requirement would not be ARAR for the site. In addition, there is more discretion in the determination of relevant and appropriate; it is possible for only part of a requirement to be considered relevant and appropriate in a given case.

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[11] Defined in RCRA §3015(b) and 40 CFR 264.301(C) and 265.301(a).

The first step of this determination is a screen of the requirements based on the factors listed in Exhibit 1-7 to determine if the requirement is potentially relevant at the site. If the requirement is relevant, then the comparison should be further refined to determine if the requirement is appropriate, focusing on the characteristics of the site and the proposed remedial action. The determination that a requirement is relevant and appropriate is site-specific and must rely on best professional judgment.

When the analysis results in a determination that a requirement is both relevant and appropriate, such a requirement must be complied with to the same degree as if it were applicable.

More detailed discussion of the determination of relevance and appropriateness is provided in section 1.2.4.3 following.

1.2.2.1 Definitions of Substantive and Administrative Requirements

Section 121(e) of CERCLA codifies EPA's earlier policy that on-site response actions may proceed without obtaining permits. This permit exemption allows the response action to proceed in an expeditious manner, free from potential lengthy delays of approval by administrative bodies. This permit exemption applies to all administrative requirements, whether or not they are actually styled as "permits." Thus, in determining the extent to which on-site CERCLA response actions must comply with other environmental and public health laws, one should distinguish between substantive requirements, which may be applicable or relevant and appropriate, and administrative requirements, which are not. The determination of whether a requirement is substantive need not be documented.

Substantive requirements are those requirements that pertain directly to actions or conditions in the environment. Examples of substantive requirements include quantitative health- or risk-based restrictions upon exposure to types of hazardous substances (e.g. MCLs establishing drinking water standards for particular contaminants), technology-based requirements for actions taken upon hazardous substances (e.g. incinerator standards requiring particular destruction and removal efficiency), and restrictions upon activities in certain special locations (e.g. standards prohibiting certain types of facilities in floodplains).

Administrative requirements are those mechanisms that facilitate the implementation of the substantive requirements of a statute or regulation. Administrative requirements include the approval of, or consultation with administrative bodies, consultation, issuance of permits, documentation, reporting,[12] recordkeeping, and enforcement. In general, administrative requirements prescribe methods and procedures by which substantive requirements are made effective for purposes of a particular environmental or

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[12] Note that some requirements may be written to contain substantive requirements in sections which primarily address administrative requirements such as reporting.

public health program. For example, the requirement of the Fish and Wildlife Coordination Act to consult with the U.S. Fish and Wildlife service, Department of the Interior, and appropriate State agency before controlling or modifying any stream or other water body is administrative.

This distinction is important because while off-site remedies must obtain all necessary permits and fulfill all administrative procedures, cleanup activities that remain on-site are statutorily exempted by CERCLA §121(e) from obtaining permits. While Superfund cleanups will comply with all the substantive requirements that permits enforce, on-site CERCLA cleanups are not required to obtain the actual permit papers, or to obtain the approval of State or local administrative boards. Instead, the Feasibility Study, the Proposed Plan, the ROD, the Community Relations Plan, and the Administrative Record will document that the substantive requirements of other Federal and State laws have been identified and will be complied with.

The CERCLA program has its own set of administrative procedures which assure proper implementation of CERCLA. The application of additional or conflicting administrative requirements could result in delay or confusion.

In most cases, the classification of a particular requirement as substantive or administrative will be clear, but some requirements may fall in the area between provisions related primarily to program administration and those concerned primarily with environmental and human health goals. The following considerations may be balanced in determining whether such requirements are substantive or administrative:

- The basic purpose of the requirement;
- Any adverse effect on the ability of the action to protect human health and the environment if the requirement were not met;
- The existence of other requirements (e.g., CERCLA procedures) at the site that would provide functionally equivalent compliance;
- Classification of similar or identical requirements as substantive or administrative in other CERCLA situations.

1.2.3 TYPES OF ARARs

The laws and regulations that establish the universe of applicable or relevant and appropriate requirements are listed in Exhibit 1-9 at the end of this chapter. Exhibit 1-9 offers an overview of ARARs and is provided for reference purposes. Exhibits 1-1, 1-2, and 1-3 present potential chemical-, location-, and action-specific ARARs respectively, and must be examined in light of site-specific circumstances to determine the actual ARARs for each site. These exhibits will be expanded or revised as necessary to reflect changes in the laws or in regulations. An automated Federal ARARs database will be developed.

The manual also includes in Exhibit 1-10 other Federal (and selected State) criteria, advisories, and guidance to be considered (TBCs). TBCs are not ARARs, but chemical-specific TBC values such as health advisories and reference doses will be used in the absence of ARARs or where ARARs are not sufficiently protective to develop cleanup goals (see discussion of risk assessment in Section 1.2.3.1 below). In addition, other TBC materials such as guidance or policy documents developed to implement regulations may be considered and used as appropriate, where necessary to ensure protectiveness.

1.2.3.1 Chemical-Specific Requirements

Chemical-specific ARARs are usually health- or risk-based numerical values or methodologies which, when applied to site-specific conditions, result in the establishment of numerical values. These values establish the acceptable amount or concentration of a chemical that may be found in, or discharged to, the ambient environment.[13] If a chemical has more than one such requirement that is ARAR, the most stringent generally should be complied with. There are, at present, only a limited number of chemical-specific requirements.

The results of a risk assessment, following the procedures in the Superfund Public Health Evaluation Manual (SPHEM), are used in setting cleanup goals that are protective. As described in the SPHEM, the total carcinogenic risk or hazard index for all chemicals of concern in a medium is calculated in this risk assessment. As a starting point for setting cleanup goals, the risk calculations are developed using chemical-specific requirements. If there are no chemical-specific ARARs, then specified Federal or State TBC values are used in the calculations.

In general, chemical-specific requirements are set for a single chemical or closely-related group of chemicals. These requirements typically do not consider the mixtures of chemicals that may be found at Superfund sites. Therefore, due to site-specific factors, cleanup goals set at the levels of

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[13] Some Federal or State statutes, such as the Clean Water Act, may establish a methodology for setting site-specific discharge limitations. Such requirements may also be ARARs, depending on site-specific considerations.

single chemical-specific requirements may not adequately protect human health or the environment at that site. In these instances, cleanup goals would be set below the chemical-specific requirements (i.e., at more stringent levels). Similarly, cleanup goals at a site may also be set below the TBC value in order to protect human health and the environment.

Exhibit 1-1 provides a matrix of chemical-specific standards established under several statutes. These chemical-specific requirements will generally be more likely to be relevant and appropriate rather than applicable to CERCLA actions. Chapters 2 through 4 provide detailed guidance in evaluating these potential ARARs. It will be necessary to examine these standards in light of site-specific circumstances to determine actual ARARs for each site. At present, Exhibit 1-1 contains standards developed under the Resource Conservation and Recovery Act (RCRA), the Safe Drinking Water Act (SDWA), and the Clean Water Act (CWA), but does not include standards developed under other environmental laws, such as programs for the protection of air quality (e.g., National Ambient Air Quality Standards). As additional statutes are analyzed, the matrix will be expanded to include any standards established under those statutes that are potential ARARs.

The following chemical-specific standards are included in the matrix:

RCRA Maximum Concentration Limits. Standards (abbreviated as RCRA MCLs) for 14 toxic compounds, primarily toxic metals and pesticides, have been adopted as a part of RCRA ground-water protection standards (40 CFR §264.94). These ground-water protection standards are equal to MCLs established under the National Primary Drinking Water Standards, based on the 1962 Public Health Service Regulations under the Safe Drinking Water Act (SDWA). The basic jurisdictional prerequisites for RCRA MCLs are part of the RCRA ground-water monitoring and response requirements, which apply to RCRA regulated units subject to permitting (landfills, surface impoundments, waste piles, and land treatment units) that received RCRA hazardous waste after July 26, 1982. If a comparison of indicator concentrations from background and downgradient wells shows a statistically significant increase, a ground-water protection standard is established for all hazardous constituents. The baseline protection standard is the background level of the constituent, or one of the 14 RCRA MCLs, whichever is higher. Alternatively, an alternate concentration limit (ACL) may be applied for and granted on a site-specific basis, if the constituent (in the quantity specified in the ACL) will not pose a substantial present or potential hazard to human health and the environment.

SDWA Maximum Contaminant Levels. Standards (also abbreviated as MCLs) for 30 toxic compounds, including the 14 compounds adopted as RCRA MCLs, have been adopted as enforceable standards for public drinking water systems (40 CFR §§141.11-141.16). MCLs for non-carcinogens are based in part on the allowable lifetime exposure to the contaminant for a 70 kg (154 pound) adult who is presumed to consume 2 liters (0.53 gallons) of water per day. In addition to

health factors, an MCL is required to reflect the technical and economic feasibility of removing the contaminant from the water supply. MCLs for each contaminant regulated must be set as close as feasible to the MCL Goal for that contaminant, given the best available technology and treatment techniques. The basic jurisdictional prerequisite for MCLs is that they apply to "public water systems," defined as systems for the provision of piped water for human consumption with at least 15 service connections or serving at least 25 persons. The SDWA Amendments of 1986 require EPA to promulgate National Primary Drinking Water Standards for 83 contaminants within three years. Thereafter, EPA is required to promulgate standards for 25 more contaminants every three years.

SDWA MCL Goals. MCL Goals (MCLGs) (formerly known as recommended MCLs or RMCLs) are non-enforceable health goals for public water systems. EPA has promulgated MCLGs for 9 contaminants (40 CFR §§141.50-141.51) and has proposed MCLGs for 40 others (50 FR 46936). MCLGs are set at levels that would result in no known or anticipated adverse health effects with an adequate margin of safety. MCLGs for substances considered to be probable human carcinogens are set at the zero level, and MCLGs for substances that are not probable human carcinogens are set based upon chronic toxicity or other data. MCLGs are potentially relevant and appropriate standards under CERCLA §121.

Water Quality Criteria (WQC). CERCLA §121 states that remedial actions shall attain Federal water quality criteria where they are relevant and appropriate under the circumstances of the release or threatened release. This determination is to be based on the designated or potential use of the water, the media affected, the purposes of the criteria, and current information. Water quality criteria are non-enforceable guidance developed under Clean Water Act (CWA) §304 and are used by the State, in conjunction with a designated use for a stream segment, to establish water quality standards under CWA §303. In determining the applicability or relevance and appropriateness of water quality criteria, the most important factors to consider are the designated uses of the water and the purposes for which the potential requirements are intended. A water quality criteria component for aquatic life may be found relevant and appropriate when there are environmental factors that are being considered at a site, such as protection of aquatic organisms. With respect to the use of water quality criteria for protection of human health, levels are provided for exposure both from drinking the water and from consuming aquatic organisms (primarily fish) and from fish consumption alone. Whether a water quality criterion is relevant and appropriate and which form of the criterion is appropriate depends on the likely route(s) of exposure. A summary of water quality criteria may be found in Quality Criteria for Water 1986, EPA 44/5-86-001, May 1, 1986 (51 Federal Register 43665) - commonly referred to as the "Gold Book."

EXHIBIT 1-1

SELECTED CHEMICAL-SPECIFIC POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS a/

RCRA AND SDWA MCLS

Chemical Name	Potential ARARs b/ RCRA Maximum Concentration Limits (mg/l)	SDWA Maximum Contaminant Levels (mg/l)
Arsenic	5.0×10^{-2}	5.0×10^{-2}
Barium	1.0	1.0
Benzene		5.0×10^{-3}
Beta Particle Photon Radioactivity		4 millirems
Cadmium	1.0×10^{-2}	1.0×10^{-2}
Carbon Tetrachloride		5.0×10^{-3}
Chromium	5.0×10^{-2}	5.0×10^{-2}
Coliform Bacteria		1 per 100 ml
p-Dichlorobenzene		7.5×10^{-2}
1,2-Dichloroethane		5.0×10^{-3}
1,1-Dichloroethylene		7.0×10^{-3}
2-4-Dichlorophenoxyacetic Acid (2,4-D)	1.0×10^{-1}	1.0×10^{-1}
Endrin	2.0×10^{-4}	2.0×10^{-4}
Fluoride		4.0
Lead	5.0×10^{-2}	5.0×10^{-2}
Lindane	4.0×10^{-3}	4.0×10^{-3}
Total Mercury	2.0×10^{-3}	2.0×10^{-3}
Methoxychlor	1.0×10^{-1}	1.0×10^{-1}
Nitrate (as N)		10
Radionuclides, gross alpha particle activity		15 pCi/l
Radium-226 + Radium-228		5 pCi/l
Selenium	1.0×10^{-2}	1.0×10^{-2}
Silver	5.0×10^{-2}	5.0×10^{-2}
Toxaphene	5.0×10^{-3}	5.0×10^{-3}
2,4,5-TP Silvex	1.0×10^{-2}	1.0×10^{-2}
1,1,1-Trichloroethane		2.0×10^{-1}
Trichloroethylene		5.0×10^{-3}
Total Trihalomethanes		1.0×10^{-1}
Turbidity		1 Tu
Vinyl Chloride		2.0×10^{-3}

EXHIBIT 1-1 (continued)

SELECTED CHEMICAL-SPECIFIC POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS a/

	Potential ARARs b/				For Use In Special Circumstances
	CWA Water Quality Criteria for Protection of Human Health		CWA Ambient Water Quality Criteria for Protection of Aquatic Life c/		
Chemical Name	Water and Fish Ingestion (mg/l)	Fish Consumption Only (mg/l)	Freshwater Acute/Chronic (mg/l)	Marine Acute/Chronic (mg/l)	SDWA/MCL Goal (mg/l) d/
Acenapthene			1.7*/0.5*	0.9*/0.7*	
Acenaphthylene				3.0x10-01*	
Acrolein	3.2x10-01	7.8x10-01	6.8x10-02*/2.1x10-02*	5.5x10-02*	
Acrylonitrile	5.8x10-05	6.5x10-04	7.5*/2.6*		
Aldrin	7.4x10-08	7.9x10-08	3.0x10-03	1.3x10-03	
Anthracene					
Antimony and Compounds	1.5x10-01	45	9.0/1.6		
Arsenic and Compounds	2.2x10-06	1.8x10-05			
Arsenic (V) and Compounds			0.8*/4.8x10-02*	2.3*/1.3x10-02	
Arsenic (III) and Compounds			0.3/0.1	6.9x10-02/3.6x10-02	
Asbestos					
Barium and Compounds	1				
Benz(a)anthracene					
Benz(c)acridine					0
Benzene	6.6x10-04	4.0x10-02	5.3*	5.1*/0.7*	
Benzidine	1.2x10-04	5.3x10-04	2.5*		
Benzo(a)pyrene					
Benzo(b)fluoranthene					
Benzo(ghi)perylene					
Benzo(k)fluoranthene					
Beryllium and Compounds	6.8x10-06	1.2x10-04	0.1*/5.3x10-03*		
Bis(2-chloroethyl)ether					
Bis(2-chloroisopropyl)ether					
Bis(chloromethyl)ether					

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EXHIBIT 1-1 (continued)

SELECTED CHEMICAL-SPECIFIC POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS a/

	Potential ARARs b/				For Use In Special Circumstances
	CWA Water Quality Criteria for Protection of Human Health		CWA Ambient Water Quality Criteria for Protection of Aquatic Life c/		
Chemical Name	Water and Fish Ingestion (mg/l)	Fish Consumption Only (mg/l)	Freshwater Acute/Chronic (mg/l)	Marine Acute/Chronic (mg/l)	SDWA/MCL Goal (mg/l) d/
Cadmium and Compounds	1.0x10-02		3.9x10-03+/1.1x10-03+	4.3x10-02/9.3x10-02	
Carbon Tetrachloride	4.0x10-04	6.9x10-03	3.5x10+01	5.0x10+01	0
Chlordane	4.6x10-07	4.8x10-07	2.4x10-03/4.3x10-06	9.0x10-05/4.0x10-06	
Chlorinated Benzenes			2.5x10-01*/5.0x10-02*	1.6x10-01*/1.2x10-01*	
Chlorinated Naphthalenes			1.6*	7.5x10-03*	
Chloroalkyl Ethers			2.3x10+02*		
Chlorobenzene (Mono)					
Chlorodibromomethane					
Chloroform	1.9x10-04	1.8x10-02	2.8x10+01*/1.2*		
2-Chlorophenol			4.3*/2.0*		
Chromium III and Compounds	170	3433	1.7+/0.2+	1.0x10+01	
Chromium VI and Compounds	5.0x10-02		1.6x10-02/1.1x10-02	1.1/5.0x10-02	
Copper and Compounds			1.8x10-02+/1.2x10-02+	2.9x10-03/2.9x10-03	
Cyanides	2x10-01		2.2x10-02/5.2x10-03	1.0x10-03/1.0x10-03	
DDT	2.4x10-08	2.4x10-08	1.1x10-03/1.0x10-06	1.3x10-04/1.0x10-06	
Dibutyl Phthalate	35	154			
Dichlorobenzenes	4x10-01	2.6	1.1*/7.6x10-01*	1.9*	
1,2-Dichlorobenzene					
1,3-Dichlorobenzene					
1,4-Dichlorobenzene					7.5x10-01
3,3'-Dichlorobenzidine	1x10-04	2x10-05			
1,2-Dichloroethane (EDC)	9.4x10-04	2.4x10-01	1.1x10+02*/2.0x10+01*	1.1x10+02*	0
Dichloroethylenes	3.3x10-05	1.9x10-03	1.1x10+01*	2.2+02*	

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EXHIBIT 1-1 (continued)

SELECTED CHEMICAL-SPECIFIC POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS a/

Chemical Name	Potential ARARs b/				For Use In Special Circumstances
	CWA Water Quality Criteria for Protection of Human Health		CWA Ambient Water Quality Criteria for Protection of Aquatic Life c/		
	Water and Fish Ingestion (mg/l)	Fish Consumption Only (mg/l)	Freshwater Acute/Chronic (mg/l)	Marine Acute/Chronic (mg/l)	SDWA/MCL Goal (mg/l) d/
1,1-Dichloroethylene	3.1		1.1x10+01*	2.2x10+02*	7.0x10-03
2,4-Dichlorophenol			2.0*/0.3*		
2,6-Dichlorophenol					
3,4-Dichlorophenol					
2,3-Dichlorophenol					
2,5-Dichlorophenol					
2,4-Dichlorophenoxyacetic Acid (2,4-D)					7.0x10-03
1,3-Dichloropropene	8.7x10-02	14.1	6.0*/0.2*	0.7*	
Dieldrin	7.1x10-08	7.6x10-08	2.5x10-03/1.9x10-06	0.7x10-03/1.9x10-06	
Diethylphthalate	350	1800			
Bis(2-ethylhexyl)phthalate (DEHP)					
Diethylnitrosamine					
7,12-Dimethylbenz(a)anthracene					
Dimethylnitrosamine					
2,4-Dimethylphenol			2.1*		
Dimethylphthalate	313	2900			
4,6-Dinitro-o-cresol					
2,4-Dinitrophenol					
1,2-Diphenylhydrazine					
Endosulfan	7.4x10-02	1.6x10-01	2.2x10-04/5.6x10-05	3.4x10-05/8.7x10-06	
Endrin	1x10-03		1.8x10-04/2.3x10-06	3.7x10-05/2.3x10-06	
Ethylbenzene	1.4	3.3	3.2x10+01	4.3x10-01*	
Fluoranthene	4.2x10-02	5.4x10-02	3.9*	4.0x10-02*/1.6x10-02*	
Fluorides		4.0			

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EXHIBIT 1-1 (continued)

SELECTED CHEMICAL-SPECIFIC POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS a/

	Potential ARARs b/				Circumstances
	CWA Water Quality Criteria for Protection of Human Health		CWA Ambient Water Quality Criteria for Protection of Aquatic Life c/		
Chemical Name	Water and Fish Ingestion (mg/l)	Fish Consumption Only (mg/l)	Freshwater Acute/Chronic (mg/l)	Marine Acute/Chronic (mg/l)	SDWA/MCL Goal (mg/l) d/
Heptachlor	2.8x10-07	2.9x10-07	5.2x10-04/3.8x10-06	5.3x10-05/3.6x10-06	
Hexachlorobenzene	7.2x10-07	7.4x10-07			
Hexacalorobutadiene	4.5x10-04	5x10-02	9.0x10-02/9.3x10-03*	3.2x10-02*	
alpha-Hexachlorocyclohexane (HCCH)	9.2x10-06	3.1x10-05			
gamma-HCCH (Lindane)					
Technical-HCCH	1.2x10-05	4.1x10-05			
Hexachlorocyclopentadiene	2.1x10-01		7.0x10-03*/5.2x10-03*	7.0x10-03*	
Hexachloroethane	1.9x10-03	8.74x10-03	9.8x10-01*/5.4x10-01*	9.4x10-01*	
Iodomethane					
Isophorone			1.17x10+02*	1.2x10+01*	
Lead and Compounds (Inorganic)	5x10-02		8.0x10-02/3.2x10-03+	0.1/5.6x10-03	
Mercury and Compounds (Alkyl)			2.4x10-03/1.2x10-05	2.14x10-03/2.5x10-05	
Mercury and Compounds (Inorganic)	1.4x10-04	1.5x10-04	2.4x10-03/1.2x10-05	2.1x10-03/2.5x10-05	
Methoxychlor	1x10-01		0.3x10-04*	0.3x10-04*	
Methyl Chloride					
2-Methyl-4-chlorophenol					
3-Methyl-4-chlorophenol					
3-Methyl-6-chlorophenol					
3-Monochlorophenol					
4-Monochlorophenol					
Nickel and Compounds	1.3x10-10	1x10-01	1.4+/1.6x10-01+	7.5x10-02/8.3x10-03	
Nitrate (as N)	10				
Nitrobenzene	20		2.7x10+01*	6.6	
Nitrophenols			2.3x10-01*/1.5x10-01*	4.8*	

EXHIBIT 1-1 (continued)

SELECTED CHEMICAL-SPECIFIC POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS a/

	Potential ARARs b/				For Use In Special Circumstances
	CWA Water Quality Criteria for Protection of Human Health		CWA Ambient Water Quality Criteria for Protection of Aquatic Life c/		
Chemical Name	Water and Fish Ingestion (mg/l)	Fish Consumption Only (mg/l)	Freshwater Acute/Chronic (mg/l)	Marine Acute/Chronic (mg/l)	SDWA/MCL Goal (mg/l) d/
Nitrosamines			5.8*	3.3x10+03*	
n-Nitrosodiphenylamine	4.9x10-03	1.6x10-02			
N-Nitrosopyrrolidine	1.6x10-05	9.2x10-02			
Para Dichorobenzene					
Pentachlorinated Ethanes			7.2*/1.1*	3.9x10-01*/2.8x10-01*	
Pentachlorobenzene	7.4x10-02	8.5x10-02			
Pentachlorophenol	1		2.0x10-02/1.3x10-02	1.3x10-02/7.9x10-03	
Phenanthrene					
Phenol	3.5		1.0x10+01/2.5	5.8	
Phthalate Esters			9.4x10-01*/3.0x10-03*	2.9*/3.4x10-03*	
Polychlorinated Biphenyls (PCBs)	7.9x10-08	7.9x10-08	2.0x10-03/1.4x10-05	1.0x10-02/3.0x10-05	
Radionuclides, Gross alpha activity		15 pCi/l			
Radium 226 and 228		5 pCi/l			
Selenium and Compounds	1.0x10-02	1.0x10-02	2.6x10-01/3.5x10-02	4.1x10-01/5.4x10-02	
Silver and Compounds	5.0x10-02	5.0x10-02	4.1x10-03+/1.2x10-04	2.3x10-03	
Strontium-90		8 pCi/l			
2,3,7,8-TCDD (Dioxin)			<1.0x10-05*/<1.0x10-08		
Tetrachlorinated Ethanes			9.3*		
1,2,4,5-Tetrachlorobenzene	3.8x10-02	4.8x10-02			
1,1,2,2-Tetrachloroethane	1.7x10-04	1.1x10-02	2.4*	9.0*	
Tetrachloroethanes			9.3*		
Tetrachloroethylene	8x10-04	8.9x10-03	5.2*/8.4x10-01*	1.0x10+01*/4.5x10-01*	
2,3,4,6-Tetrachlorophenol				4.4x10-01	
Thallium and Compounds	1.3x10-02	4.8x10-02	1.4*/4.0x10-02*	2.1x10-03*	

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EXHIBIT 1-1 (continued)

SELECTED CHEMICAL-SPECIFIC POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS a/

	Potential ARARs b/				For Use In Special Circumstances
	CWA Water Quality Criteria for Protection of Human Health		CWA Ambient Water Quality Criteria for Protection of Aquatic Life c/		
Chemical Name	Water and Fish Ingestion (mg/l)	Fish Consumption Only (mg/l)	Freshwater Acute/Chronic (mg/l)	Marine Acute/Chronic (mg/l)	SDWA/MCL Goal (mg/l) d/
Toluene	14	420	1.7x10+01*	6.3*/5.0*	
Toxaphene	7.1x10-07	7.3x10-07	7.3x10-04/2.0x10-07	2.1x10-04/2x10-07	
Tribromomethane (Bromoform)					
Trichlorinated Ethanes			1.8x10+01*		
1,1,1-Trichloroethane	18	1000		3.1x10+01*	2.0x10-01
1,1,2-Trichloroethane	6x10-04	4.2x10-02	9.4*		
Trichloroethylene	2.7x10-03	8.1x10-02	4.5x10+01*/2.1x10+01*	2.0*	0
Trichloromonofluoromethane					
2,4,5-Trichlorophenol	2.8				
2,4,6-Trichlorophenol	1.2x10-03	3.6x10-03	9.7x10-01*		
2,4,5-Trichlorophenoxypropionic Acid					
Trihalomethanes (Total) b					
Tritium					
Vinyl Chloride	2x10-03	5.3x10-01			0
Zinc and Compounds			1.3x10-01/1.1x10-01	9.6x10-02/8.6x10-02	

a/ Additional chemical-specific requirements will be added (e.g. National Ambient Air Quality Criteria) after analysis of additional statutes.

b/ When two or more values conflict, the lower value generally should be used.

c/ Federal water quality criteria (FWQC) are not legally enforceable standards, but are potentially relevant and appropriate to CERCLA actions. CERCLA §121(d)(2)(B)(i) requires consideration of four factors when determining whether FWQC are relevant and appropriate: 1) the designatied or potential use of the surface or groundwater, 2) the environmental media affected, 3) the purposes for which such criteria were developed, and 4) the latest information available.

d/ For water that is to be used for drinking, the MCLs set under the SDWA are generally the applicable or relevant and appropriate standard. A standard for drinking water more stringent than an MCL may be needed in special circumstances, such as where multiple contaminants in ground water or multiple pathways of exposure present extraordinary risks. In setting a level more stringent than the MCL in such cases, a site-specific determination should be made by considering MCLGs, the Agency's policy on the use of appropriate risk ranges for carcinogens (10-4 to 10-7 individual lifetime risk), levels of quantification, and other pertinent guidelines. Prior consultation with Headquarters is encouraged in such cases.

* Lowest Observed Effect Level.
+ Hardness dependent criteria (100 mg/l used); refer to specific criteria documents for equations to calculate criteria based on other water hardness values.

Sources: U.S. EPA, Superfund Public Health Evaluation Manual. EPA 540/1-86/060 (OSWER Directive 9285.4-1) October 1986 and U.S. EPA, Quality Criteria for Water 1986, EPA 440/5-86-001, May 1986 (51 Federal Register 43665).

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1.2.3.2 Location-Specific Requirements

A site's location is a fundamental determinant of its impact on human health and the environment. Location-specific ARARs are restrictions placed on the concentration of hazardous substances or the conduct of activities solely because they are in specific locations. Some examples of special locations include floodplains, wetlands, historic places, and sensitive ecosystems or habitats. An example of a location-specific requirement is the substantive CWA §404 prohibitions of the unrestricted discharge of dredged or fill material into wetlands.

Exhibit 1-2 provides a matrix of location-specific requirements, established under several statutes, that are potential ARARs. At present, the matrix contains requirements established under a number of different environmental statutes. As additional statutes are analyzed, the matrix will be expanded to include their location-specific requirements.

The following location-specific requirements are included in the matrix:

RCRA Location Requirements. RCRA contains a number of explicit limitations on where on-site storage, treatment, or disposal of hazardous waste may occur. In addition to the location criteria already contained in RCRA regulations, the Hazardous and Solid Waste Amendments of 1984 (HSWA) also mandate the development of location requirements concerning vulnerable hydrogeology (see RCRA §3004(o)(7)). When those regulations are promulgated, they will be added to the matrix. It should be emphasized that guidance issued under RCRA also should be considered when necessary to achieve protectiveness, but is not binding (i.e., is not ARAR) for determining what actions should be taken at a particular location.[14] HSWA land disposal restrictions also prohibit placement of hazardous wastes in certain formations (salt domes, salt bed formations, and underground mines or caves) and list certain wastes, which will be evaluated for prohibition by EPA under RCRA by August 8, 1988, June 8, 1989, and May 8, 1990 (40 CFR §265.18, 40 CFR Part 268)

National Historic Preservation Act of 1966 (NHPA)*. Requires action to take into account effects on properties included in or eligible for the National Register of Historic Places and to minimize harm to National Historic Landmarks.

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[14] RCRA guidance which may be considered includes: Permit Writers' Guidance Manual for the Location of Hazardous Waste Land Storage and Disposal Facilities: Phase I, Criteria for Location Acceptability and Existing Regulations for Evaluating Locations (final draft), February 1985; Permit Applicants' Guidance Manual for the General Facility Standards of 40 CFR 264, SW-968, October 1983; and Guidelines for Ground-Water Classification Under the EPA Ground-Water Protection Strategy, (final draft), December 1986.

*Endangered Species Act. Requires action to avoid jeopardizing the continued existence of listed endangered or threatened species or modification of their habitat.

*Wilderness Act. Establishes nondegradation, maximum restoration, and protection of wilderness areas as primary management principles.

*Fish and Wildlife Coordination Act. Requires action to protect fish and wildlife from actions modifying streams or areas affecting streams.

*Wild and Scenic Rivers Act. Requires action to avoid adverse effects on designated wild or scenic rivers.

*Coastal Zone Management Act. Requires activities affecting land or water uses in a coastal zone to certify noninterference with coastal zone management.

Clean Water Act. Section 404 prohibits discharge of dredged or fill material into navigable waters without a permit. CERCLA on-site actions do not require a permit, but the substantive requirements of §404 regarding such a discharge would be ARAR.[15]

40 CFR Part 6 Appendix A. Sets forth EPA policy for carrying out the provisions of Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands).[16]

*These and other statutes will be addressed in a later addition to this manual.

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[15] Note that Section 118(a)(1) of the CWA as amended by the Water Quality Act (WQA) of 1987 specifically provides that the United States should seek to attain the goals of the Great Lakes Water Quality Agreement (GLWQA), with particular emphasis on the goals related to toxic pollutants. Section 118(a)(1) also provides that EPA should take the lead in the effort to meet the GLWQA goals. Accordingly, the GLWQA will be very pertinent to sites having discharges to the Great Lakes drainage basin.

[16] Executive orders are binding on the section of the government for which they are issued.

EXHIBIT 1-2

SELECTED LOCATION-SPECIFIC POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS a/

Location	Requirement	Prerequisite	Citation
Within 61 meters (200 feet) of a fault displaced in Honocene time	New treatment, storage, or disposal of hazardous waste prohibited	RCRA hazardous waste; treatment, storage, or disposal	40 CFR 264.18(a)
Within 100-year floodplain	Facility must be designed, constructed, operated, and maintained to avoid washout	RCRA hazardous waste; treatment, storage, or disposal	40 CFR 264.18(b)
Within floodplain b/	Action to avoid adverse effects, minimize potential harm, restore and preserve natural and beneficial values	Action that will occur in a floodplain, i.e., lowlands, and relatively flat areas adjoining inland and coastal waters and other flood prone areas	Protection of floodplains, b/ (40 CFR 6, Appendix A); Fish and Wildlife Coordination Act (16 USC 661 et seq.); 40 CFR 6.302
Within salt dome formation, underground mine, or cave	Placement of non-containerized or bulk liquid hazardous waste prohibited	RCRA hazardous waste; placement	40 CFR 264.18(c)
Within area where action may cause irreparable harm, loss, or destruction of significant artifacts	Action to recover and preserve artifacts	Alteration of terrain that threatens significant scientific, prehistorical, historical or archaeological data	National Historical Preservation Act (16 USC Section 469); 36 CFR Part 65
Historic project owned or controlled by Federal agency	Action to preserve historic properties; planning of action to minimize harm to National Historic Landmarks	Property included in or eligible for the National Register of Historic Places	National Historic Preservation Act, Section 106 (16 USC 470 et seq.); 36 CFR Part 800
Critical habitat upon which endangered species or threatened species depends	Action to conserve endangered species or threatened species, including consultation with the Department of Interior	Determination of presence of endangered or threatened species	Endangered Species Act of 1973 (16 USC 1531 et seq.); 50 CFR Part 200, 50 CFR Part 402 Fish and Wildlife Coordination Act (16 USC 661 et seq.); 33 CFR Parts 320-330.

EXHIBIT 1-2 (Continued)

SELECTED LOCATION-SPECIFIC POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Location	Requirement	Prerequisite	Citation
Wetlands b/	Action to prohibit discharge of dredged or fill material into wetlands without permit	Wetlands as defined in U.S Army Corps of Engineers regulations	Clean Water Act section 404; 40 CFR Parts 230, 33 CFR Parts 320-330.
	Action to avoid adverse effects, minimize potential harm, and preserve and enhance wetlands, to the extent possible (see discussion in section 3.4.4.1)	Action involving construction of facilities or management of property in wetlands, as defined by 40 CFR Part 6, Appendix A, section 4 (j)	40 CFR Part 6, Appendix A
Wilderness area	Area must be administered in such manner as will leave it unimpaired as wilderness and to preserve its wilderness	Federally-owned area designated as wilderness area	Wilderness Act (16 USC 1131 et seq.); 50 CFR 35.1 et seq.
Wildlife refuge	Only actions allowed under the provisions of 16 USC Section 668 dd(c) may be undertaken in areas that are part of the National Wildlife Refuge System	Area designated as part of National Wildlife Refuge System	16 USC 668dd et seq.; 50 CFR Part 27
Area affecting stream or river	Action to protect fish or wildlife	Diversion, channeling or other activity that modifies a stream or river and affects fish or wildlife	Fish and Wildlife Coordination Act (16 USC 661 et seq.); 40 CFR 6.302
Within area affecting national wild, scenic, or recreational river	Avoid taking or assisting in action that will have direct adverse effect on scenic river	Activities that affect or may affect any of the rivers specified in section 1276(a)	Wild and Scenic Rivers Act (16 USC 1271 et seq. section 7 (a)); 40 CFR 6.302(e)
Within coastal zone	Conduct activities in manner consistent with approved State management programs	Activities affecting the coastal zone including lands therein and thereunder and adjacent shorelands	Coastal Zone Management Act (16 USC Section 1451 et seq.)
Within designated coastal barrier	Prohibits any new Federal expenditure within the Coastal Barrier Resource System	Activity within the Coastal Barrier Resource System	Coastal Barrier Resources Act (16 USC 3501 et seq.)

a/ Additional location-specific requirements will be added after analysis of additional sources and will be included in a subsequent draft of this manual.

b/ 40 CFR Part 6 Subpart A sets forth EPA policy for carrying out the provisions of Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands). Executive orders are binding on the level (e.g., Federal, State) of government for which they are issued.

1.2.3.3 Action-Specific Requirements

Action-specific ARARs are usually technology- or activity-based requirements or limitations on actions taken with respect to hazardous wastes. These requirements are triggered by the particular remedial activities that are selected to accomplish a remedy. Since there are usually several alternative actions for any remedial site, very different requirements can come into play. These action-specific requirements do not in themselves determine the remedial alternative; rather, they indicate how a selected alternative must be achieved.

Exhibit 1-3 provides a matrix of action-specific requirements established under the Resource Conservation and Recovery Act (RCRA) and the Clean Water Act. As the statute that is directed toward the management of hazardous waste, RCRA provides the largest number of pertinent action-specific requirements. However, detailed corrective action requirements, which would provide action-specific requirements for the types of actions most similar to CERCLA remedies, have not yet been promulgated. RCRA corrective action requirements and other action-specific requirements in other statutes will be added to subsequent drafts of this matrix as requirements are promulgated or as the other statutes are analyzed.

The actions described in Exhibit 1-3 were identified as potential CERCLA remedial alternatives from past Records of Decision (RODs). The terms used below to describe remedial actions are explained more fully in later chapters. They include the following:

Air Stripping
Capping
Closure with No Post-Closure Care (e.g., Clean Closure - removal or decontamination of all residuals such that health-based standards are met)
Closure with Waste In Place (i.e., capping or disposal closure)
Closure of Land Treatment Units
Consolidation within Unit
Consolidation between Units
Container Storage
Construction of New Landfill On-Site
Construction of New Surface Impoundment On-Site
Dike Stabilization
Discharge of Treatment System Effluent
Direct Discharge to Ocean
Discharge to Publicly Owned Treatment Works (POTW)
Discharge of Dredge and Fill Material to Waters of the U.S. or Ocean Waters
Dredging
Excavation
Gas Collection
Ground-Water Diversion

Incineration (on-site)
Land Treatment
Operation and Maintenance (O&M) (post-closure care)
Placement of Liquid Waste in Landfill
Placement of Waste in Land Disposal Unit
Slurry Wall
Surface Water Control
Tank Storage (on-site)
Treatment (in a unit)
Treatment (when waste will be land disposed)
Underground Injection of Wastes and Treated Ground Water
Waste Pile

EXHIBIT 1-3

SELECTED ACTION-SPECIFIC POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS a/

Actions b/	Requirements	Prerequisites for Applicability c/,d/	Citation
Air Stripping	[CAA requirements to be provided.]		
Capping (See also Closure with Waste in Place for additional associated requirements)	Placement of a cap over waste (e.g., closing a landfill, or closing a surface impoundment or waste pile as a landfill, or similar action) requires a cover designed and constructed to: o Provide long-term minimization of migration of liquids through the capped area; o Function with minimum maintenance; o Promote drainage and minimize erosion or abrasion of the cover; o Accommodate settling and subsidence so that the cover's integrity is maintained; and o Have a permeability less than or equal to the permeability of any bottom liner system or natural sub-soils present.	RCRA hazardous waste placed at site after the effective date of the requirements, or placement of hazardous waste into another unit will make requirements applicable when the waste is being covered with a cap for the purpose of leaving it behind after the remedy is completed. Capping without such placement will not make requirements applicable. d/	40 CFR 264.228(a) (Surface Impoundments) 40 CFR 264.258(b) (Waste Piles) 40 CFR 264.310(a) (Landfills)

a/ Currently only RCRA, CWA, and SDWA requirements are included. Additional action-specific requirements will be added as additional statutes are analyzed.

b/ Action alternatives from ROD keyword index, FY1986 Record of Decision Annual Report, January 1987, Hazardous Site Control Division, EPA.

c/ Requirements have been proposed but not promulgated for air stripping, hybrid closure, gas collection and miscellaneous unit treatment. When these regulations are promulgated, they will be included in the matrix.

d/ Some action-specific requirements listed may be relevant and appropriate even if RCRA definitions of storage, disposal, or hazardous waste are not met, or if the waste at the site is similar to but not identifiable as a RCRA hazardous waste. See Chapter 2 for information on relevant and appropriate RCRA requirements.

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EXHIBIT 1-3 (continued)

SELECTED ACTION-SPECIFIC POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS a/

Actions b/	Requirements	Prerequisites for Applicability c/,d/	Citation
Capping (continued)	Eliminate free liquids, stabilize wastes before capping (surface impoundments).		40 CFR 264.228(a)
	Restrict post-closure use of property as necessary to prevent damage to the cover.		40 CFR 264.117(c)
	Prevent run-on and run-off from damaging cover.		40 CFR 264.228(b) 40 CFR 264.310(b)
	Protect and maintain surveyed benchmarks used to locate waste cells (landfills, waste piles).		40 CFR 264.310(b)
Closure with No Post-Closure Care (e.g. Clean Closure)	General performance standard requires elimination of need for further maintenance and control; elimination of post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated run-off, or hazardous waste decomposition products.	Applicable to land-based unit containing hazardous waste.[d] Applicable to RCRA hazardous waste (listed or characteristic) placed at site after the effective date of the requirements, or placed into another unit. Not applicable to material treated, stored, or disposed only before the effective date of the requirements, or if treated in-situ, or consolidated within area of contamination. Designed for cleanup that will not require long-term management. Designed for cleanup to health-based standards.	40 CFR 264.111
	Disposal or decontamination of equipment, structures, and soils. Removal or decontamination of all waste residues, contaminated containment system components (e.g., liners, dikes), contaminated subsoils, and structures and equipment contaminated with waste and leachate, and management of them as hazardous waste.	May apply to surface impoundments and container or tank liners and hazardous waste residues, and to contaminated soil, including soil from dredging or soil disturbed in the course of drilling or excavation, and returned to land.	40 CFR 264.111 40 CFR 264.178 40 CFR 264.197 40 CFR 264.288(o)(1) and 40 CFR 264.258
	Meet health-based levels at unit.		40 CFR 244.111

d/ Some action-specific requirements listed may be relevant and appropriate even if RCRA definitions of storage, disposal, or hazardous waste are not met, or if the waste at the site is similar to but not identifiable as a RCRA hazardous waste. See Chapter 2 for information on relevant and appropriate RCRA requirements.

EXHIBIT 1-3 (continued)

SELECTED ACTION-SPECIFIC POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS a/

Actions b/	Requirements	Prerequisites for Applicability c/,d/	Citation
Closure with Waste In Place	Eliminate free liquids by removal or solidification. Stabilization of remaining waste and waste residues to support cover.	Applicable to land disposal of hazardous waste.d/ Applicable to RCRA hazardous waste (listed or characteristic) placed at site after the effective date of the requirements, or placed into another unit. Not applicable to material treated, stored, or disposed only before the effective date of the requirements, or if treated in-situ or consolidated within area of contamination.	40 CFR 264.228(a)(2) 40 CFR 264.228(a)(2) 40 CFR 264.258(b)
	Installation of final cover to provide long-term minimization of infiltration (see Capping).		40 CFR 264.310
	30-year post-closure care and ground-water monitoring.e/		40 CFR 264.310
Closure of Land Treatment Units	Maximize degradation, transformation, or immobilization of hazardous constituents within the treatment zone, minimize run-off of constituents, maintain run-on control system and run-off management system, control wind dispersal of hazardous waste, maintain unsaturated zone monitoring, establish vegetative cover, and establish background soil values to determine consistency with permit values.	Closure of land treatment units.	40 CFR 264.280
Consolidation within a Unit	None applicable.d/	Consolidation within a unit.f/	

e/ Regional administrator may revise length of post-closure care period (40 CFR 264.117).

EXHIBIT 1-3 (continued)

SELECTED ACTION-SPECIFIC POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS a/

Actions b/	Requirements	Prerequisites for Applicability c/,d/	Citation
Consolidation between Units	With respect to the waste that is moved, see requirements in the following sections: Capping, Closure with Waste in Place, Container Storage, Construction of a New Landfill On-Site, Construction of a New Surface Impoundment On-Site, Incineration (On-Site), Land Treatment, Operation and Maintenance, Tank Storage, and Treatment.	Movement of hazardous waste and placement into another unit.	See Capping, Closure with Waste in Place, Container Storage, Construction of a New Landfill On-Site, Construction of a New Surface Impoundment On-Site, Incineration (On-Site), Land Treatment, Operation and Maintenance, Tank Storage, and Treatment in this exhibit.
Container Storage	Containers of RCRA hazardous waste must be:	Storage of RCRA hazardous waste (listed or characteristic) not meeting small quantity generator criteria held for a temporary period greater than 90 days before treatment, disposal, or storage elsewhere (40 CFR 264.10), in a container (i.e., any portable device in which a material is stored, transported, disposed of, or handled). A generator who accumulates or stores hazardous waste on-site for 90 days or less in compliance with 40 CFR 262.34(a)(1-4) is not subject to full RCRA storage requirements. Small quantity generators are not subject to the 90 day limit (40 CFR 262.34(c),(d), and (e)).	
	o Maintained in good condition;		40 CFR 264.171
	o Compatible with hazardous waste to be stored; and		40 CFR 264.172
	o Closed during storage (except to add or remove waste).		40 CFR 264.173
	Inspect container storage areas weekly for deterioration.		40 CFR 264.174
	Place containers on a sloped, crack-free base, and protect from contact with accumulated liquid. Provide containment system with a capacity of 10 percent of the volume of containers of free liquids. Remove spilled or leaked waste in a timely manner to prevent overflow of the containment system.		40 CFR 264.175

g/ In many cases, there are no defined "units" at a CERCLA site. Instead, there are areas of contamination with differing concentration levels (including hot spots) of hazardous substances, pollutants, or contaminants. When RCRA hazardous wastes are moved into or out of an area of contamination, RCRA disposal requirements are applicable to the waste being managed and certain treatment, storage, or disposal requirements (such as for closure) are applicable to the area where the waste is received.

EXHIBIT 1-3 (continued)

SELECTED ACTION-SPECIFIC POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS a/

Actions b/	Requirements	Prerequisites for Applicability c/,d/	Citation
Container Storage (continued)	Keep containers of ignitable or reactive waste at least 50 feet from the facility's property line.		40 CFR 264.176
	Keep incompatible materials separate. Separate incompatible materials stored near each other by a dike or other barrier.		40 CFR 264.177
	At closure, remove all hazardous waste and residues from the containment system, and decontaminate or remove all containers, liners.		40 CFR 264.178
	Storage of banned wastes must be in accordance with 40 CFR 268. When such storage occurs beyond one year, the owner/operator bears the burden or proving that such storage is solely for the purpose of accumulating sufficient quantities to allow for proper recovery, treatment, and disposal.		40 CFR 268.50
Construction of New Landfill On-Site (see Closure with Waste in Place).	Minimum Technology Requirements:	RCRA hazardous waste (listed or characteristic) currently being placed in a new, replacement, or expanded landfill.	40 CFR 264.301
	Install two liners or more, a top liner that prevents waste migration into the liner, and a bottom liner that prevents waste migration through the liner.h/		
	Install leachate collection systems above and between the liners.		40 CFR 264.301

h/ Landfill units meeting the requirements of 40 CFR 264.301(f) are not subject to RCRA minimum technology requirements.

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EXHIBIT 1-3 (continued)

SELECTED ACTION-SPECIFIC POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS a/

Actions b/	Requirements	Prerequisites for Applicability c/,d/	Citation
Construction of New Landfill (see Closure with Waste in Place) (continued)	Construct run-on and run-off control systems capable of handling the peak discharge of a 25-year storm.		40 CFR 264.301
	Control wind dispersal of particulates.		40 CFR 264.301
	Operation and maintenance.		40 CFR 264.303-304
	Close each cell with a final cover after the last waste has been received.		40 CFR 264.310
	Ground-water Monitoring		
	Establish a detection monitoring program (264.98). Establish a compliance monitoring program (264.99) and corrective action monitoring program (264.100) when required by 40 CFR 264.91. All monitoring programs must meet RCRA general ground-water monitoring requirements (264.97)	Creation of a new landfill unit to treat, store, or dispose of RCRA hazardous wastes as part of a response action.	40 CFR 264.91- 264.100

EXHIBIT 1-3 (continued)

SELECTED ACTION-SPECIFIC POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS a/

Actions b/	Requirements	Prerequisites for Applicability c/,d/	Citation
Construction of a New Surface Impoundment (see Closure with Waste in Place and Closure with no Post-Closure Care)	Minimum Technology Requirements:		
	Use two liners, a top liner that prevents waste migration into the liner and a bottom liner that prevents waste migration through the liner (throughout the post-closure period).	RCRA hazardous waste (listed or characteristic) currently being placed in a new surface impoundment, or use of replacement or lateral extension of existing landfills or surface impoundments.	40 CFR 264.220
	Design liners to prevent failure due to pressure gradients, contact with the waste, climatic conditions, and the stress of installation and daily operations.		40 CFR 264.221
	Provide a leachate collection system between the two liners.		40 CFR 264.221
	Use a leak detection system that will detect leaks at the earliest possible time.		40 CFR 264.221
	Ground-water Monitoring		
	Establish a detection monitoring program (264.98). Establish a compliance monitoring program (264.99) and corrective action monitoring program (264.100) when required by 40 CFR 264.91. All monitoring programs must meet RCRA general ground-water monitoring requirements (264.97)	Creation of a new landfill unit to treat, store, or dispose of RCRA hazardous wastes as part of a remedial action.	40 CFR 264.91-264.100

EXHIBIT 1-3 (continued)

SELECTED ACTION-SPECIFIC POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS a/

Actions b/	Requirements	Prerequisites for Applicability c/,d/	Citation
Dike Stabilization	Design and operate facility to prevent overtopping due to overfilling: wind and wave action; rainfall; run-on; malfunctions of level controllers, alarms, and other equipment; and human error.	Existing surface impoundment containing hazardous waste, or creation of a new surface impoundment.	40 CFR 264.221
	Construct dikes with sufficient strength to prevent massive failure.		40 CFR 264.221
	Inspect liners and cover systems during and after construction.		40 CFR 264.226
	Inspect weekly for proper operation and integrity of the containment devices.		40 CFR 264.226
	Remove surface impoundment from operation if the dike leaks or there is a sudden drop in liquid level.		40 CFR 264.227
	At closure, remove or decontaminate all waste residues and contaminated materials. Otherwise, free liquids must be removed, the remaining wastes stabilized, and the facility closed in the same manner as a landfill.		40 CFR 264.228
	Manage ignitable or reactive wastes so that it is protected from materials or conditions that may cause it to ignite or react.		40 CFR 264.227

EXHIBIT 1-3 (continued)

SELECTED ACTION-SPECIFIC POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS a/

Actions b/	Requirements	Prerequisites for Applicability c/,d/	Citation
Discharge of Treatment System Effluent	Best Available Technology:		
	Use of best available technology (BAT) economically achievable is required to control toxic and nonconventional pollutants. Use of best conventional pollutant control technology (BCT) is required to control conventional pollutants. Technology-based limitations may be determined on a case-by-case basis.	Point source discharge to waters of the United States. i/ j/	40 CFR 122.44(a)
	Water Quality Standards:		
	Applicable Federally approved State water quality standards must be complied with. These standards may be in addition to or more stringent than other Federal standards under the CWA. k/		40 CFR 122.44 and State regulations approved under 40 CFR 131
	Discharge limitations must be established at more stringent levels than technology-based standards for toxic pollutants.		40 CFR 122.44(e)
	Best Management Practices:		
	Develop and implement a Best Management Practices program to prevent the release of toxic constituents to surface waters.		40 CFR 125.100

i/ "Waters of the U.S." is defined broadly in 40 CFR 122.2 and includes essentially any water body and wetland.

j/ Section 121 of SARA exempts on-site CERCLA activities from obtaining permits. However, the substantive requirements of a law or regulation must be met. In particular, on-site discharges to surface waters are exempt from procedural NPDES permit requirements. Off-site dischargers would be required to apply for and obtain an NPDES permit.

k/ Federal Water Quality Criteria may be relevant and appropriate depending on the designated or potential use of the water, the media affected, the purposes of the criteria, and current information. (CERCLA §121(d)(2)(B)(i)) Federal Water Quality Criteria for the protection of aquatic life will be relevant and appropriate when environmental factors (e.g., protection of aquatic organisms) are being considered. (50 FR 30784 [July 29, 1985]).

EXHIBIT 1-3 (continued)

SELECTED ACTION-SPECIFIC POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS a/

Actions b/	Requirements	Prerequisites for Applicability c/,d/	Citation
Discharge of Treatment System Effluent (continued)	The Best Management Practices program must: o Establish specific procedures for the control of toxic and hazardous pollutant spills. o Include a prediction of direction, rate of flow, and total quantity of toxic pollutants where experience indicates a reasonable potential for equipment failure. o Assure proper management of solid and hazardous waste in accordance with regulations promulgated under RCRA.	Discharge to waters of the U.S. j/	40 CFR 125.104
	Monitoring Requirements: Discharge must be monitored to assure compliance. Discharge will monitor: o The mass of each pollutant o The volume of effluent o Frequency of discharge and other measurements as appropriate		40 CFR 122.41(i)
	Approved test methods for waste constituent to be monitored must be followed. Detailed requirements for analytical procedures and quality controls are provided. Sample preservation procedures, container materials, and maximum allowable holding times are prescribed.		40 CFR 136.1-136.4

j/ Section 121 of SARA exempts on-site CERCLA activities from obtaining permits. However, the substantive requirements of a law or regulation must be met. In particular, on-site discharges to surface waters are exempt from procedural NPDES permit requirements. Off-site dischargers would be required to apply for and obtain an NPDES permit.

EXHIBIT 1-3 (continued)

SELECTED ACTION-SPECIFIC POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS a/

Actions b/	Requirements	Prerequisites for Applicability c/,d/	Citation
Discharge of Treatment System Effluent (continued)	Comply with additional substantive conditions such as: o Duty to mitigate any adverse effects of any discharge; and o Proper operation and maintenance of treatment systems.		40 CFR 122.41(i)
Direct Discharge to Ocean	Discharges causing "unreasonable degradation of the marine environment" are not permitted.	Discharge to the marine environment. 1/	40 CFR 125.123(b)
	A determination of whether a discharge will cause reasonable degradation of the marine environment must be made, based on consideration of: o Quantity, composition, or persistence of pollutants to be discharged; o Potential transport of pollutants by biological, chemical, or physical processes; o Composition and vulnerability of exposed communities; o Importance of the receiving water to spawning, migratory paths, and surrounding biological community; o Existence of special aquatic sites; o Impact on human health and commercial fishing;		40 CFR 125.122

1/ CWA §403 requires that an NPDES permit be issued for discharges into marine waters, including territorial seas, the contiguous zone, and the oceans. (40 CFR 122.2.) A permit is not required if point of discharge is on-site.

EXHIBIT 1-3 (continued)

SELECTED ACTION-SPECIFIC POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS a/

Actions b/	Requirements	Prerequisites for Applicability c/,d/	Citation
Direct Discharge to Ocean (continued)	o Applicable requirements of the Coastal Zone Management Plan (see Vol. 3 of this manual); and o Marine Water Quality Criteria developed under CWA §304(a)(1).		
	Comply with the limiting permissible concentrations (LPCs) at the mixing zone boundary that are established in the permit.		40 CFR 125.123(d)(1)
Discharge to Publicly Owned Treatment Works (POTW) (off-site activity, see footnote g/)	Discharge of pollutants that pass-through the POTW without treatment, interfere with POTW operation, contaminate POTW sludge, or endanger health/safety of POTW workers, is prohibited. Specific prohibitions preclude the discharge of pollutants to POTWs that: o Create a fire or explosion hazard in the POTW; o Will cause corrosive structural change to POTW; o Obstruct flow resulting in interference; o Are discharged at a flow rate and/or concentration that will result in interference; and o Increase the temperature of waste-water entering the treatment plant that would result in interference, but in no case raise the POTW influent temperature above 104°F (40°C).	Indirect discharge to a POTW.	40 CFR 403.5

g/ Discharge to POTWs is considered an off-site activity (see p. 3-21 for discussion of requirements); therefore, requirements related to discharge to a POTW are not ARARs, but are included in this exhibit for reference. Off-site actions must comply with all legally applicable requirements, both substantive and administrative. The concept of "relevant and appropriate" is not available for off-site actions.

EXHIBIT 1-3 (continued)

SELECTED ACTION-SPECIFIC POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS a/

Actions b/	Requirements	Prerequisites for Applicability c/,d/	Citation
Discharge to Publicly Owned Treatment Works (POTW) (continued)	o Discharge must comply with local POTW pretreatment program, including POTW-specific pollutants, spill prevention program requirements, and reporting and monitoring requirements.		40 CFR 403.5 and local POTW regulations
	o RCRA permit-by-rule requirements (including corrective action where the NPDES permit was issued after November 8, 1984) must be complied with for discharges of RCRA hazardous wastes to POTWs.	Transport of RCRA hazardous wastes to POTWs by truck, rail, or dedicated pipe (i.e., pipe solely dedicated for hazardous waste [as defined in 40 CFR 264] which discharges from within the boundaries of the CERCLA site to within the boundaries of the POTW).	40 CFR 270.60
Discharge of Dredge and Fill Material to Waters of the U.S. or Ocean Waters	The four conditions that must be satisfied before dredge and fill is an allowable alternative are: o There must be no practical alternative. o Discharge of dredged or fill material must not cause a violation of State water quality standards, violate any applicable toxic effluent standards, jeopardize an endangered species, or injure a marine sanctuary. o No discharge shall be permitted that will cause or contribute to significant degradation of the water. o Appropriate steps to minimize adverse effects must be taken. Determine long- and short-term effects on physical, chemical, and biological components of the aquatic ecosystem.	Capping, dike stabilization, construction of beams and levees, and disposal of contaminated soil, waste material or dredged material are examples of activities that may involve a discharge of dredged or fill material.	40 CFR 230 33 CFR 320-330

EXHIBIT 1-3 (continued)

SELECTED ACTION-SPECIFIC POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS a/

Actions b/	Requirements	Prerequisites for Applicability c/,d/	Citation
Dredging	Removal of all contaminated soil.	RCRA hazardous waste placed at site after the effective date of the requirements, or placed into another unit.	See Closure in this Exhibit.
	Dredging must comply with Section 10 of the Rivers and Harbors Act and U.S. Army Corps of Engineers regulations.	Dredging in navigable waters of the United States.	33 U.S.C. 403 33 CFR 320-330
Excavation	Movement of excavated materials to new location and placement in or on land will trigger land disposal restrictions for the excavated waste or closure requirements for the unit in which the waste is being placed.	Materials containing RCRA hazardous wastes subject to land disposal restrictions are placed in another unit.	40 CFR 268 (Subpart D)
	Area from which materials are excavated may require cleanup to levels established by closure requirements.	RCRA hazardous waste placed at site after the effective date of the requirements.	See Closure in this Exhibit.
Gas Collection	[CAA requirements to be provided.]		
Ground-Water Diversion	Excavation of soil for construction of slurry wall may trigger closure or land disposal restrictions.	Materials containing RCRA hazardous waste subject to land disposal restrictions are placed into another unit.	See Consolidation in this Exhibit.
Incineration	Analyze the waste feed.	RCRA hazardous waste.	40 CFR 264.341
	Dispose of all hazardous waste and residues, including ash, scrubber water, and scrubber sludge.		40 CFR 264.351
	No further requirements apply to incinerators that only burn wastes that are listed as hazardous solely by virtue of combination with other wastes, and if the waste analysis demonstrates that no Appendix VII constituent is present that might reasonably be expected to be present.		40 CFR 264.340

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EXHIBIT 1-3 (continued)

SELECTED ACTION-SPECIFIC POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS a/

Actions b/	Requirements	Prerequisites for Applicability c/,d/	Citation
Incineration (continued)	Performance standards for incinerators:	RCRA hazardous waste.	40 CFR 264.343
	o Achieve a destruction and removal efficiency of 99.99 percent for each principal organic hazardous constituent in the waste feed and 99.9999 percent for dioxins:		
	o Reduce hydrogen chloride emissions to 1.8 kg/hr or 1 percent of the HCl in the stack gases before entering any pollution control devices; and		40 CFR 264.342
	o Not release particulate in excess of 180 mg/dscm corrected for amount of oxygen in stack gas.		40 CFR 264.343
	Monitoring of various parameters during operation of the incinerator is required. These parameters include:		40 CFR 264.343
	o Combustion temperature; o Waste feed rate; o An indicator of combustion gas velocity; and o Carbon monoxide.		
	Control fugitive emissions either by:		40 CFR 264.345
	o Keeping combustion zone sealed or o Maintaining combustion-zone pressure lower than atmospheric pressure		
	Utilize automatic cutoff system to stop waste feed when operating conditions deviate.		

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EXHIBIT 1-3 (continued)

SELECTED ACTION-SPECIFIC POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS a/

Actions b/	Requirements	Prerequisites for Applicability c/,d/	Citation
Incineration (continued)	Special performance standard for incineration of PCBs: o Achieve a destruction and removal efficiency of 99.9999 percent; o Either 2 second dwell time at 1200 degrees C° (±100) and 3 percent excess oxygen in stack gas; or 1.5 second dwell time at 1600 degrees C. and 2 percent excess oxygen in stack gas; and o For non-liquid PCBs, mass air emissions from the incinerator shall be no greater than 0.001 g. KB per kg of the PCBs entering the incinerator.	Liquid and non-liquid PCBs at concentrations of 50 ppm or greater.	40 CFR 761.70
Land Treatment	Prior to land treatment, the waste must be treated to BDAT levels or meet a no migration standard.	RCRA hazardous waste being treated or placed into another unit.	
	Ensure that hazardous constituents are degraded, transformed, or immobilized within the treatment zone.		40 CFR 264.271
	Maximum depth of treatment zone must be no more than 1.5 meters (5 feet) from the initial soil surface and more than 1 meter (3 feet) above the seasonal high water table.		40 CFR 264.271
	Demonstrate that hazardous constituents for each waste can be completely degraded, transformed, or immobilized in the treatment zone.		40 CFR 264.271
	Minimize run-off of hazardous constituents.		40 CFR 264.273
	Maintain run-on/run-off control and management system.		40 CFR 264.273

EXHIBIT 1-3 (continued)

SELECTED ACTION-SPECIFIC POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS a/

Actions b/	Requirements	Prerequisites for Applicability c/,d/	Citation
Land Treatment (continued)	Special application conditions if food-chain crops are grown in or on treatment zone.		40 CFR 264.276
	Unsaturated zone monitoring.		40 CFR 264.278
	Special requirements for ignitable or reactive waste.		40 CFR 264.281
	Special requirements for incompatible wastes.		40 CFR 264.282
	Special testing and location requirements for certain hazardous wastes.	RCRA waste #s F020, F021, F022, F023, F026, F027 (dioxin-containing wastes).	40 CFR 264.283
Operation and Maintenance (O&M)	30-year post-closure care to ensure that site is maintained and monitored.	Land disposal closure.	40 CFR 264.310
Placement of Liquid Waste in Landfill	Liquids in Landfills Prohibition:		
	No bulk or non-containerized liquid hazardous waste or hazardous waste containing free liquids may be disposed of in landfills.	Placement of a bulk or non-containerized RCRA hazardous waste in a landfill.	40 CFR 264.314
	Containers holding free liquids may not be placed in a landfill unless the liquid is mixed with an absorbent or solidified.		40 CFR 264.314
Placement of Waste in Land Disposal Unit	Land Disposal Restrictions:		
	Attain land disposal "treatment standards" before putting waste into landfill in order to comply with land ban restrictions. A treatment standard can be either: (1) a concentration level to be achieved (performance-based) or (2) a specified technology that must be used (technology-based). If the standard is performance-based, any technology can be used to achieve the standard. (See Treatment when Waste will be Land Disposed.)	Placement of RCRA hazardous waste in a landfill, surface impoundment, waste pile, injection well, land treatment facility, salt dome formation, salt bed formation, or underground mine or cave.	40 CFR 268 (Subpart D)

EXHIBIT 1-3 (continued)

SELECTED ACTION-SPECIFIC POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS a/

Actions b/	Requirements	Prerequisites for Applicability c/,d/	Citation
Slurry Wall	Excavation of soil for construction of slurry wall may trigger land disposal restrictions.	Materials containing RCRA hazardous waste subject to land disposal restrictions are placed in another unit. (See Treatment section for LDR schedule. Also see Consolidation, Excavation sections in this Exhibit.)	
Surface Water Control	Prevent run-on and control and collect run-off from a 24-hour 25-year storm (waste piles, land treatment facilities, landfills).	RCRA hazardous waste treated, stored, or disposed after the effective date of the requirements.	40 CFR 264.251(c).(d) 40 CFR 264.273(c).(d) 40 CFR 264.301(c).(d)
	Prevent over-topping of surface impoundment.		40 CFR 264.221(c)
Tank Storage (On-Site)	Tanks must have sufficient structural strength to ensure that they do not collapse, rupture, or fail.	Storage of RCRA hazardous waste (listed or characteristic) not meeting small quantity generator criteria held for a temporary period greater than 90 days before treatment, disposal, or storage elsewhere (40 CFR 264.10), in a tank (i.e., any portable device in which a material is stored, transported, disposed of, or handled). A generator who accumulates or stores hazardous waste on-site for 90 days or less in compliance with 40 CFR 262.34(a)(1-4) is not subject to full RCRA storage requirements. Small quantity generators are not subject to the 90 day limit (40 CFR 262.34(c),(d), and (e)).	40 CFR 264.190
	Waste must not be incompatible with the tank material unless the tank is protected by a liner or by other means.		40 CFR 264.191
	Tanks must be provided with secondary containment and controls to prevent overfilling, and sufficient freeboard maintained in open tanks to prevent overtopping by wave action or precipitation.		40 CFR 264.193-194
	Inspect the following: overfilling control, control equipment, monitoring data, waste level (for uncovered tanks), tank condition, above-ground portions of tanks (to assess their structural integrity), and the area surrounding the tank (to identify signs of leakage).		40 CFR 264.195
	Repair any corrosion, crack, or leak.		40 CFR 264.196

EXHIBIT 1-3 (continued)

SELECTED ACTION-SPECIFIC POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS a/

Actions b/	Requirements	Prerequisites for Applicability c/,d/	Citation
Tank Storage (On-Site) (continued)	At closure, remove all hazardous waste and hazardous waste residues from tanks, discharge control equipment, and discharge confinement structures.		40 CFR 264.197
	Store ignitable and reactive waste so as to prevent the waste from igniting or reacting. Ignitable or reactive wastes in covered tanks must comply with buffer zone requirements in "Flammable and Combustible Liquids Code," Tables 2-1 through 2-6 (National Fire Protection Association, 1976 or 1981).		40 CFR 264.198
	Storage Prohibitions:		
	Storage of banned wastes must be in accordance with 40 CFR 268. When such storage occurs beyond one year, the owner/operator bears the burden of proving that such storage is solely for the purpose of accumulating sufficient quantities to allow for proper recovery, treatment and disposal.		40 CFR 268.50
Treatment (in a unit)	Design and operating standards for unit in which hazardous waste is treated. (See citations at right for design and operating requirements for specific unit.)	Treatment of hazardous waste in a unit.	40 CFR 264.190- 264.192 (Tanks) 40 CFR 264.221 (Surface Impoundments) 40 CFR 264.251 (Waste Piles) 40 CFR 264.273 (Land Treatment Unit) 40 CFR 264.343-.345 (Incinerators) 40 CFR 264.601 (Miscellaneous Treatment Units) 40 CFR 265.373 (Thermal Treatment Units)

* * * AUGUST 8, 1988 DRAFT * * *

EXHIBIT 1-3 (continued)

SELECTED ACTION-SPECIFIC POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS a/

Actions b/	Requirements	Prerequisites for Applicability c/,d/		Citation
Treatment (when Waste will be Land Disposed)	Treatment of waste subject to ban on land disposal must attain levels achievable by best demonstrated available treatment technologies (BDAT) for each hazardous constituent in each listed waste, if residual is to be land disposed. If residual is to be further treated, initial treatment and any subsequent treatment that produces residual to be treated need not be BDAT, if it does not exceed value in CCWE (Constituent Concentration in Waste Extract) Table for each applicable water. (See 51 FR 40642, November 6, 1986.)	Disposal of contaminated soil and debris resulting from CERCLA response actions or RCRA corrective actions is not subject to land disposal prohibitions and/or treatment standards for solvents, dioxins, or California list wastes until November 8, 1990 (and for certain first third wastes until August 8, 1990).		40 CFR 268.10 40 CFR 268.11 40 CFR 268.12 40 CFR 268.41 40 CFR 268 (Subpart D)
		All wastes listed as hazardous in 40 CFR Part 261 as of November 8, 1984, except for spent solvent wastes and dioxin-containing wastes, have been ranked with respect to volume and intrinsic hazards, and are scheduled for land disposal prohibition and/or treatment standard determinations as follows:		51 FR 40641 52 FR 25760
		Solvents and dioxins	Nov. 8, 1986	
		California list wastes	July 8, 1987	
		One-third of all ranked and hazardous wastes	Aug. 8, 1988	
		Underground injection of solvents and dioxins and California list wastes	Aug. 8, 1988	
		CERCLA response action and RCRA corrective action soil and debris	Nov. 8, 1988	
		Two-thirds of all ranked and listed hazardous wastes	July 8, 1989	
		All remaining ranked and listed hazardous wastes identified by characteristic under RCRA section 3001	May 8, 1990	
		Any hazardous waste listed or identified under RCRA section 3001 after November 8, 1984	Within 6 mos. of the date of identification or listing.	

EXHIBIT 1-3 (continued)

SELECTED ACTION-SPECIFIC POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS a/

Actions b/	Requirements	Prerequisites for Applicability c/,d/	Citation
Treatment (when Waste will be Land Disposed) (continued)	BDAT standards for spent solvent wastes and dioxin-containing wastes are based on one of four technologies or combinations: for waste waters, (1) steam stripping, (2) biological treatment, or (3) carbon absorption [alone or in combination with (1) or (2)]; and for all other wastes, (4) incineration. Any technology may be used, however, if it will achieve the concentration levels specified.		40 CFR 268.30 RCRA Sections 3004(d)(3), (e)(3) 42 U.S.C. 6924(d)(3), (e)(3)
Underground Injection of Wastes and Treated Ground Water	UIC program prohibits: o Injection activities that allow movement of contaminants into underground sources of drinking water which may result in violations of MCLs or adversely affects health.	Approved UIC program is required in States listed under SDWA section 1422. (All States have been listed.) Class I wells and Class IV wells are the relevant classifications for CERCLA sites. Class I wells are used to inject hazardous waste, beneath the lowermost formation containing, within one quarter mile, an underground source of drinking water (USDW). n/	40 CFR 144.12
	o Construction of new Class IV wells, and operation and maintenance of existing wells.	Class IV wells are used to inject hazardous or radioactive waste into or above a formation which contains, within one quarter mile of the well, an underground source of drinking water.	40 CFR 144.13
	Class IV wells are banned except for reinjection of treated ground water into the same formation from which it was withdrawn, as part of a CERCLA cleanup or RCRA corrective action.		40 CFR 144.13(c)

n/ An underground source of drinking water (USDW) is a non-exempted aquifer or its portion which: (1) supplies any public water system, or (2) which contains a sufficient quantity of ground water to supply a public water system and currently supplies drinking water for human consumption or contains fewer than 10,000 mg/l total dissolved solids. (40 CFR 144.3.)

EXHIBIT 1-3 (continued)

SELECTED ACTION-SPECIFIC POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS a/

Actions b/	Requirements	Prerequisites for Applicability c/,d/	Citation
Underground Injection of Wastes and Treated Ground Water (continued)	The Director of the UIC program in a state may lessen the stringency of 40 CFR 144.52 construction, operation, and manifesting requirements for a well if injection does not occur into, through, or above a USDW or if the radius of endangering influence (see 40 CFR 146.06(c)) is less than or equal to the radius of the well.		40 CFR 144.16
	o Report non-compliance orally within 24 hours.	Class I wells.	40 CFR 144.28(b) 40 CFR 144.51(b)
	o Prepare, maintain, and comply with plugging and abandonment plan.		
	Monitor Class I wells by:	Class I wells are used to inject hazardous waste, beneath the lowermost formation containing, within one quarter mile, an underground source of drinking water (USDW).	40 CFR 144.28(g)(1)
	o frequent analysis of injection fluid;		
	o continuous monitoring of injection pressure, flow rate, and volume; and		
	o installation and monitoring of ground-water monitoring wells.		
	Applicants for Class I permits must:		40 CFR 144.55
	o Identify all injection wells within the area of review.		
	o Take action as necessary to ensure that such well are properly sealed, completed, or abandoned to prevent contamination of USDW.		
	Criteria for determining whether an aquifer may be determined to be an exempted aquifer include current and future use, yield, and water quality characteristics.		40 CFR 146.4

EXHIBIT 1-3 (continued)

SELECTED ACTION-SPECIFIC POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS a/

Actions b/	Requirements	Prerequisites for Applicability c/,d/	Citation
Underground Injection of Wastes and Treated Ground Water (continued)	Case and cement all Class I wells to prevent movement of fluids into USDW, taking into consideration well depth, injection pressure, hole size, composition of injected waste, and other factors.	(See above)	40 CFR 144.28(e)(1)
	Conduct appropriate geologic drilling logs and other tests during construction.		40 CFR 146.12(d)
	Injection pressure may not exceed a maximum level designed to ensure that injection does not initiate new fractures or propagate existing ones and cause the movement of fluids into a USDW.		40 CFR 146.13
	Continuous monitoring of injection pressure, flow rate, and volume, and annual pressure, if required.		
	Demonstration of mechanical integrity is required every 5 years.		
	Ground-water monitoring may also be required.		
	Comply with State underground injection requirements.		40 CFR 147
	Hazardous waste to be injected is subject to land ban regulations. (See section 4.2.2.1 of this manual.) Treated ground water that meets the definition of hazardous waste and is to be injected also is subject to land ban regulations.		40 CFR 268.2

EXHIBIT 1-3 (continued)

SELECTED ACTION-SPECIFIC POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS a/

Actions b/	Requirements	Prerequisites for Applicability c/,d/	Citation
Waste Pile	Use a single liner and leachate collection system.	RCRA hazardous waste, non-containerized accumulation of solid, nonflammable hazardous waste that is used for treatment or storage.	40 CFR 264.251
	Waste put into waste pile subject to land ban regulations (see Appendix of this manual).		40 CFR 268.2

* * * AUGUST 8, 1988 DRAFT * * *

1.2.4 GENERAL PROCEDURE FOR IDENTIFICATION AND ANALYSIS OF ARARS

ARARs should be identified at several points in the remedy selection process. They must be identified on a site-specific basis, and therefore as additional information is developed about the site, including the specific chemicals at the site, special features of the site location, and the actions that are being considered as remedies, more ARARS will progressively be identified and the list of "potential" ARARs further refined. The lead and support agency (Federal or State Superfund program) are responsible for the identification of ARARs with assistance from other EPA/State program offices and other Federal/State agencies as appropriate (including information and technical assistance). Regions must work closely with States, who are responsible for identifying State ARARs in a timely manner, to ensure that State ARARs are identified at the critical points in the remedial planning process. Regions must also work closely with States operating Federally authorized programs under RCRA, the Clean Water Act (CWA), the Clean Air Act, or other statutes that are sources of potential ARARs.[17]

Many statutes and the regulations promulgated under them contain requirements that may be applicable or relevant and appropriate. Exhibit 1-9 at the end of this chapter lists the statutes under which potential ARARs may have been promulgated.

In order to provide guidance on ARARs identification, this manual describes in detail the steps in the thought process involved in determining whether a requirement is applicable or relevant and appropriate. However, as experience is gained in identification, the determination may be streamlined to consideration of key factors. For example, if the hazardous substance at the site is identical to a RCRA listed hazardous waste, but its source is unknown, RCRA requirements will not be applicable but may be relevant and appropriate if the action taken is regulated by RCRA.

The decision framework for ARARs determination, as described in this manual, has five steps:

(1) The first step in the process, using the procedures described in this guidance in Exhibit 1-4 and accompanying text is to identify potential ARARs. For chemical-specific requirements under RCRA, CWA, and SDWA, location-specific requirements under several statutes, and action-specific requirements under RCRA, CWA, and SDWA, potential requirements have already been identified and are listed in Exhibits 1-1, 1-2, and 1-3, respectively. These exhibits will be expanded in subsequent drafts of this manual to include the requirements of additional environmental laws.

(2) Using the procedures described in the flowchart in Exhibit 1-5 and accompanying text, analyze the potential ARARs to determine whether

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[17] Under the Clean Water Act, States may be authorized to implement the permit requirements of the National Pollution Discharge Elimination System (NPDES); under the Clean Air Act, national ambient air quality standards are implemented, maintained, and enforced through State Implementation Plans (SIPs).

they are actually applicable to the particular conditions at the site.

(3) If the requirements are not applicable, using the procedures outlined in the flowchart in Exhibit 1-7 and discussed in section 1.2.4.3, analyze them to determine whether they are relevant and appropriate to the particular conditions at the site.

(4) In developing the site risk assessment, which is used to determine protectiveness, criteria, guidances, advisories, and proposed standards may be used in addition to ARARs. These to-be-considered criteria, guidances, advisories and proposed standards are not promulgated requirements (and are not potential ARARs), but are an important component of the protectiveness determination required by the statutes. The Superfund Public Health Evaluation Manual provides guidance on conducting site-specific risk assessments and the use of TBCs.

(5) Determine whether circumstances are present that might justify a waiver of any otherwise applicable or relevant and appropriate requirements.

Subsequent to the initiation of the remedial action new standards based on new scientific information or awareness may be developed and these standards may differ from the cleanup standards on which the remedy was based. These new ARARs or TBCs should be considered as part of the review conducted at least every five years under CERCLA §121(c) for sites where hazardous substances remain on-site. The review requires EPA to assure that human health and the environment are being protected by the remedial action. Therefore, the remedy should be examined in light of any new standards that would be applicable or relevant and appropriate to the circumstances at the site or pertinent new TBCs, in order to ensure that the remedy is still protective. In certain situations, new standards or the information on which they are based may indicate that the site presents a significant threat to health or environment. If such information comes to light at times other than at the five-year reviews, the necessity of acting to modify the remedy should be considered at such times.

An overview of the general procedure for identifying ARARs at different points in the remedial planning process is summarized in Exhibit 1-4. Identification of ARARs should begin following the scoping and site characterization phase of the Remedial Investigation, when sufficient information has been developed so that initial judgments can be made about the chemicals present at the site and any special characteristics of the site location that must be taken into account. As Exhibit 1-4 indicates, the first steps in the identification of ARARs, following the determination of chemicals present and the determination of special location characteristics, should be a review of the matrices in this manual for chemical-specific and location-specific ARARs. Action-specific ARARs will first be considered during the development of remedial alternatives. Each of these steps is described in detail in the balance of this section and in sections 1.3 and 1.4.

Exhibit 1-4
Procedure for Identifying ARARs

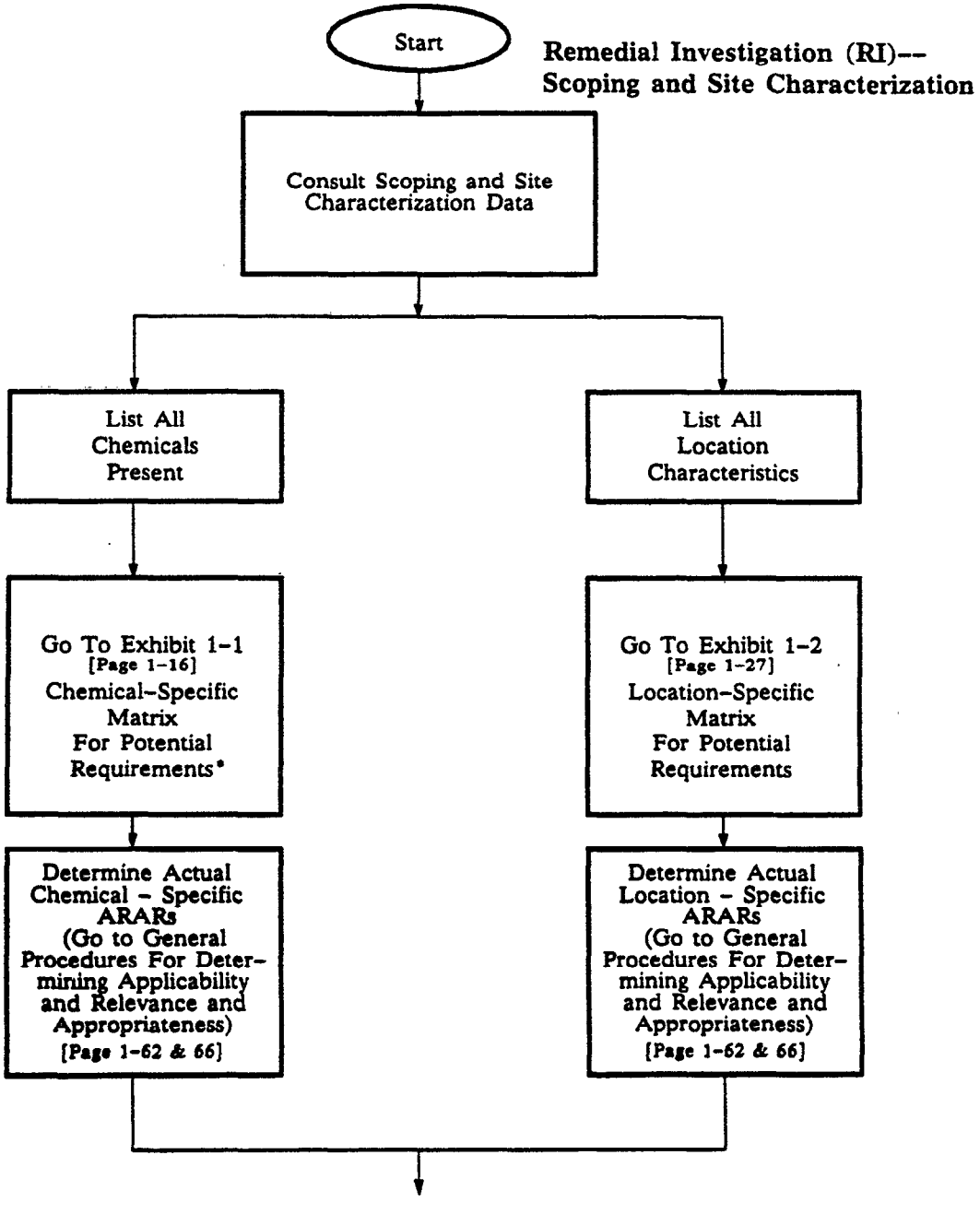
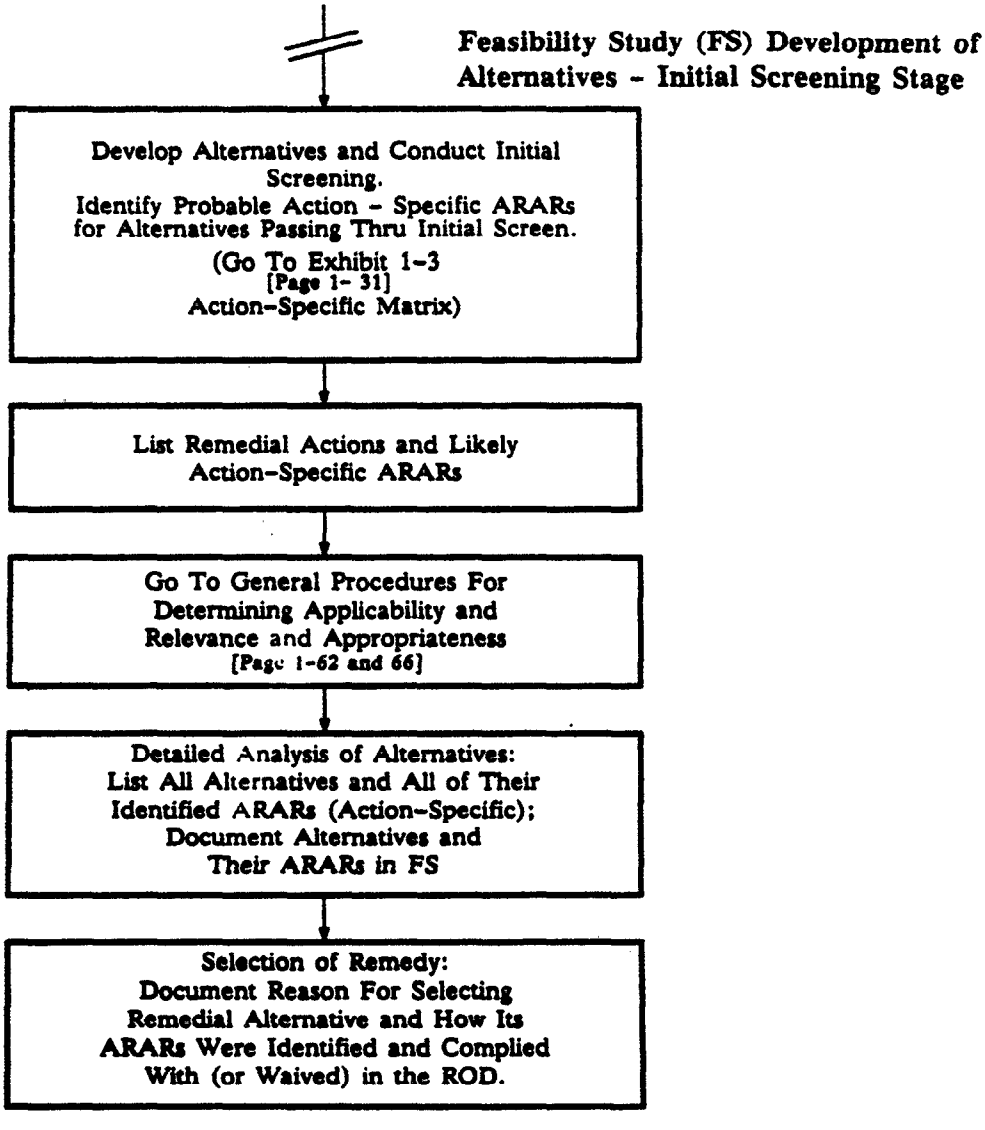


Exhibit 1-4 (cont'd)
Procedure for Identifying ARARs



* Note that chemical-specific ARARs will generally be the same for all alternatives, and need not be repeated for each alternative. A single list of chemical-specific ARARs should be developed during the site characterization phase of the Remedial Investigation and modified during the remedy selection process.

1.2.4.1 Procedure for Identifying ARARs

Chemical-Specific ARARs

Those chemicals identified at the site should be compared to the chemicals listed in Exhibit 1-1, which lists chemical-specific standards under several statutes. (Until Exhibit 1-1 is completed with chemical-specific standards from all environmental statutes, it will be necessary to supplement the matrix in Exhibit 1-1 with a review of standards in other statutes, obtained by consulting Exhibit 1-9.) If a chemical-specific standard is found in Exhibit 1-1, note the statute and its jurisdictional prerequisites under which the standard was established. This information will be necessary for determining if the chemical-specific standard is applicable or relevant and appropriate. (Although in most cases a standard found under the "potential ARAR" section of the matrix will be found to be an ARAR for site-specific chemicals and exposure pathways, Remedial Project Managers (RPMs) should follow the procedure for determining whether these probable ARARs are actually applicable or relevant and appropriate to a given site, as outlined in Sections 1.2.4.2 and 1.2.4.3 of this manual.) If more than one standard is found for a particular chemical, the most stringent should generally be identified as the likely ARAR. Finally, the standards identified as probable ARARs should all be analyzed according to the procedures outlined in the Superfund Public Health Evaluation Manual. When ARARs do not exist for a particular chemical or when the existing ARARs are not protective of human health or the environment, advisories found in the to-be-considered category should also be used.

Location-Specific ARARs

Similarly, following the completion of Phase I of the Remedial Investigation, site characterization, any special characteristics of the site (e.g., presence of wetlands, habitat of endangered species, or historically significant features) should be compared to the list of location-specific requirements in Exhibit 1-2. If a location-specific requirement is found in Exhibit 1-2, the statute and its jurisdictional requirements should be noted, so that the additional analysis described in sections 1.2.4.2 and 1.2.4.3 of this manual can be completed. In noting the statutory and regulatory requirements, determine whether the statute is prohibitory (e.g. prohibits new activity) or is retroactive (e.g. requires that existing conditions be rectified).

Action-Specific ARARs

Action-specific requirements probably will not be identified for most sites until the development of alternatives in the Feasibility Study. Additional action-specific requirements should be identified and refined as appropriate during remedial design, when specific information regarding size and operation of treatment facilities will be available. Exhibit 1-4 indicates this difference by separating the identification of action-specific ARARs from the identification of chemical-specific and location-specific ARARs. Once possible action alternatives have been developed and screened to

a workable number, they should be broken down into operable units and the type of actions that are covered by potentially applicable or relevant and appropriate statutes should be reviewed (e.g., disposal into a POTW of non-volatile substances probably will not involve Clean Air Act (CAA) considerations, therefore potential CAA requirements need not be reviewed further for that specific action).

Following the initial identification, the possible action alternatives should be compared to Exhibit 1-3 (Action-Specific Requirements) in this manual. Currently, this matrix includes RCRA and CWA action-specific requirements.

1.2.4.2 General Procedure for Determining if a Requirement is Applicable

This manual describes the process for determining applicability. The procedure is no different from that involved in determining the applicability of laws to any activity, but is provided here to promote a consistent approach to identifying applicable requirements. The basic criterion for an applicable requirement is that it directly and fully addresses or regulates the hazardous substance, pollutant, contaminant, action being taken, or other circumstances at a site. Applicability is established by the terms of the laws and regulations promulgating the requirements being analyzed. To determine whether a particular requirement would be legally applicable, it is necessary to refer to the specific terms or jurisdictional prerequisites of the statute or regulation. All pertinent jurisdictional prerequisites must be met for the requirement to be applicable. These jurisdictional prerequisites include:

- Who, as specified by the statute or regulation, is subject to its authority;[18]
- The types of substances or activities listed as falling under the authority of the statute or regulation;
- The time period for which the statute or regulation is in effect; and
- The types of activities the statute or regulation requires, limits, or prohibits.

These statutory or regulatory provisions must then be compared to the pertinent facts about the CERCLA site and the CERCLA response actions under consideration, as outlined by Exhibit 1-5. To determine if a requirement is applicable, examine its language and determine whether it would otherwise legally apply to the site or the response action. This procedure may need to be undertaken for each potentially applicable requirement and for each potential action alternative (identification of action-specific ARARs will be

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[18] Although the lead agency may be managing the CERCLA site, and for the purposes of the ARARs analysis would be the operator, it is not an owner/operator for the purposes of CERCLA Sections 107 or 101(20).

completed during the detailed analysis of alternatives), since different requirements, even those within the same group of regulations, may have different jurisdictional prerequisites. In addition, the analysis should be repeated for each different operable unit, technology, or component of the remedial action.

Exhibit 1-5 provides an outline of the general procedure for determining if a requirement is applicable. Based on the site scoping and characterization, or for action-specific ARARs the initial screening phase of the Remedial Investigation/Feasibility Study (and review during remedial design), the pertinent facts concerning the site should be identified. Many of these facts, such as the chemicals present, special characteristics of the location of the site, and the type of action under consideration for the site, will already have been determined in connection with the identification of potential ARARs. Other facts, such as the approximate date when substances were placed at the site, may also be necessary to determine if the requirement applies. Different categories of information will be necessary to determine the jurisdictional prerequisites of different requirements, and not all categories listed in Exhibit 1-5 will be pertinent in all cases. Exhibit 1-6 indicates where subsequent chapters of this manual discuss the jurisdictional prerequisites of particular requirements.

In summary, once the pertinent facts have been determined, they should be compared with the jurisdictional prerequisites of the requirement. These jurisdictional prerequisites can be found in Exhibits 1-1, 1-2, and 1-3 and are explained further in subsequent chapters of this manual. They also appear in the text of the relevant statute or regulation. If the jurisdictional prerequisites are met, the requirement is applicable. If not, the next step is to consider whether the requirement is relevant and appropriate.

Exhibit 1-5
General Procedure for Determining If Requirement is Applicable

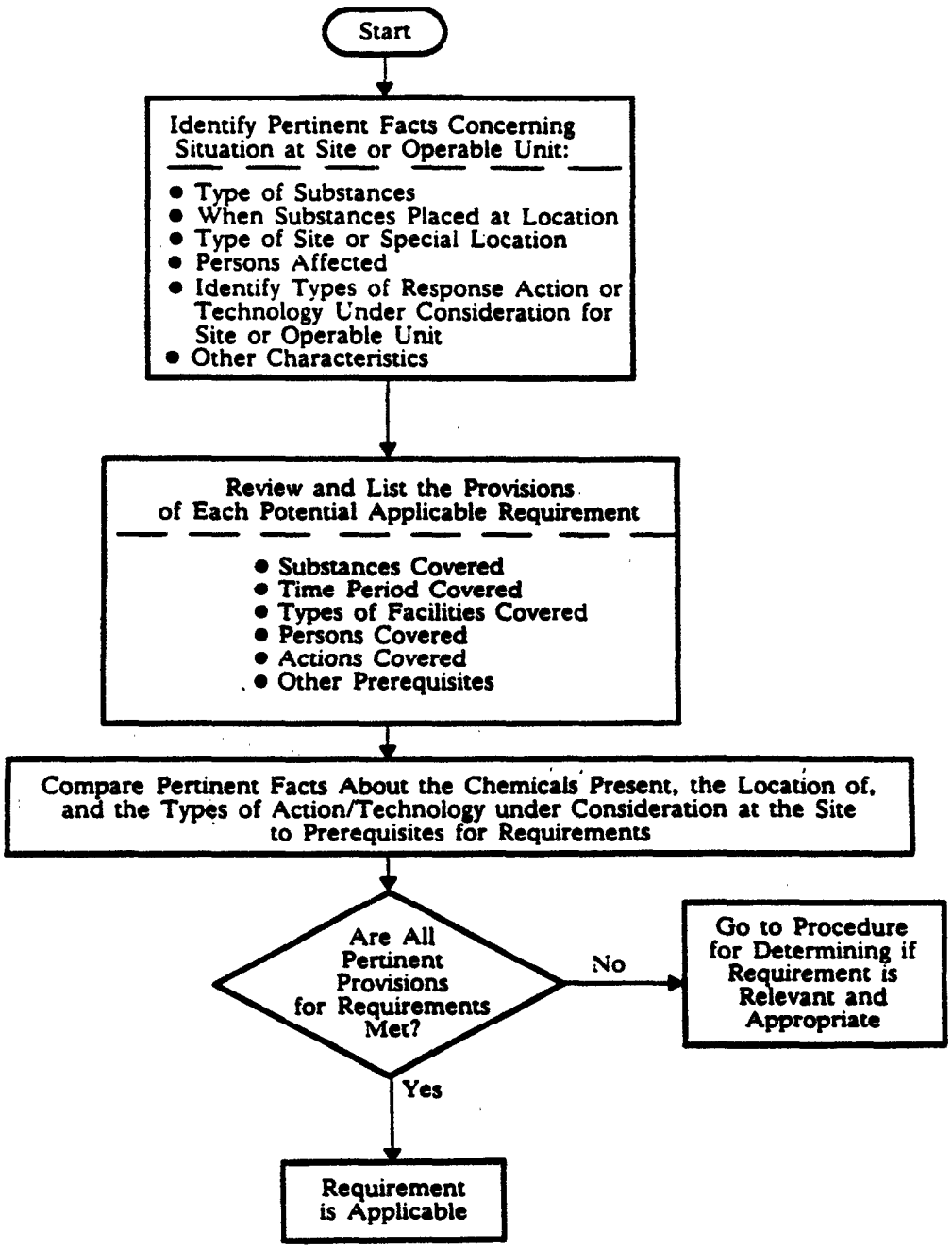


EXHIBIT 1-6

ARAR JURISDICTIONAL PREREQUISITES

Chemical-Specific ARARs	List of Possible ARARs (pages)	Jurisdictional Prerequisites/Text Discussion (pages)
RCRA MCLs	1-16	2-4 thru 2-14 2-23 thru 2-27
SDWA MCLs	1-16	4-3, 4-8
CWA WQCs	1-17 to 1-23	3-10

Location-Specific ARARs	List of Possible ARARs (pages)	Jurisdictional Prerequisites/Text Discussion (pages)
RCRA	Fault Zone, 1-27 Flood Plain, 1-27 Salt Dome Formation, 1-27	1-25 1-25 1-25
* National Historic Preservation Act	1-27	1-25
* Endangered Species Act	1-27	1-25
Clean Water Act	1-28	1-26
* Wilderness Act	1-28	1-26
* Fish and Wildlife Coordination Act	1-28	1-26
* Wild and Scenic Rivers Act	1-28	1-26
* Coastal Zone Management Act	1-28	1-26
40 CFR Part 6 Appendix A	1-28	1-26

* These and other statutes will be addressed in a later addition of this manual.

EXHIBIT 1-6 (continued)

ARAR JURISDICTIONAL PREREQUISITES

Action-Specific ARARs	List of possible ARARs (pages)	Jurisdictional Prerequisites/Text Discussion (pages)
RCRA Capping	1-31, 1-32	2-15
Closure	1-32, 1-33	2-15, 2-19
Container Storage	1-34, 1-35	2-12, 2-13
New Landfill	1-35, 1-36	2-15, 2-18
New Surface Impoundment	1-37	2-15, 2-18
Dike Stabilization	1-38	2-15
Excavation, Ground-Water Diversion	1-44	2-15, 2-21
Incineration	1-44, 1-45, 1-46	2-14
Land Treatment	1-46, 1-47	2-14, 2-15, 2-18
Land Disposal	1-34, 1-47, 1-50, 1-51	2-15, 2-18
Slurry Wall	1-48	2-15, 2-21
Tank Storage	1-48, 1-49	2-12, 2-13
Treatment	1-49, 1-50, 1-51	2-14
Waste Pile	1-54	2-15, 2-18
CWA Discharge to Water of US	1-39, 1-40, 1-41	3-2, 3-3, 3-4
Direct Discharge to Ocean	1-41, 1-42	3-2, 3-3, 3-4, 3-5
Discharge to POTW	1-42, 1-43	3-5, 3-6, 3-21, 3-22
Dredge/Fill	1-43, 1-44	3-2, 3-3, 3-6, 3-28, 3-29
SDWA Underground Injection Control	1-51, 1-52, 1-53	4-9, 4-10, 4-11

1.2.4.3 General Procedure for Determining if a Requirement is Relevant and Appropriate

A particular requirement could be "relevant and appropriate" even if it is not "applicable." The basic considerations are whether the requirement (1) regulates or addresses problems or situations sufficiently similar to those encountered at the CERCLA site (i.e., relevance), and (2) is appropriate to the circumstances of the release or threatened release, such that its use is well suited to the particular site. Determining whether a requirement is relevant and appropriate is site-specific and must be based on best professional judgment. This judgment is based on a number of factors, including the characteristics of the remedial action, the hazardous substances present at the site, and the physical circumstances of the site and of the release, as compared to the statutory or regulatory requirement. All requirements found to be applicable or relevant and appropriate must be complied with.

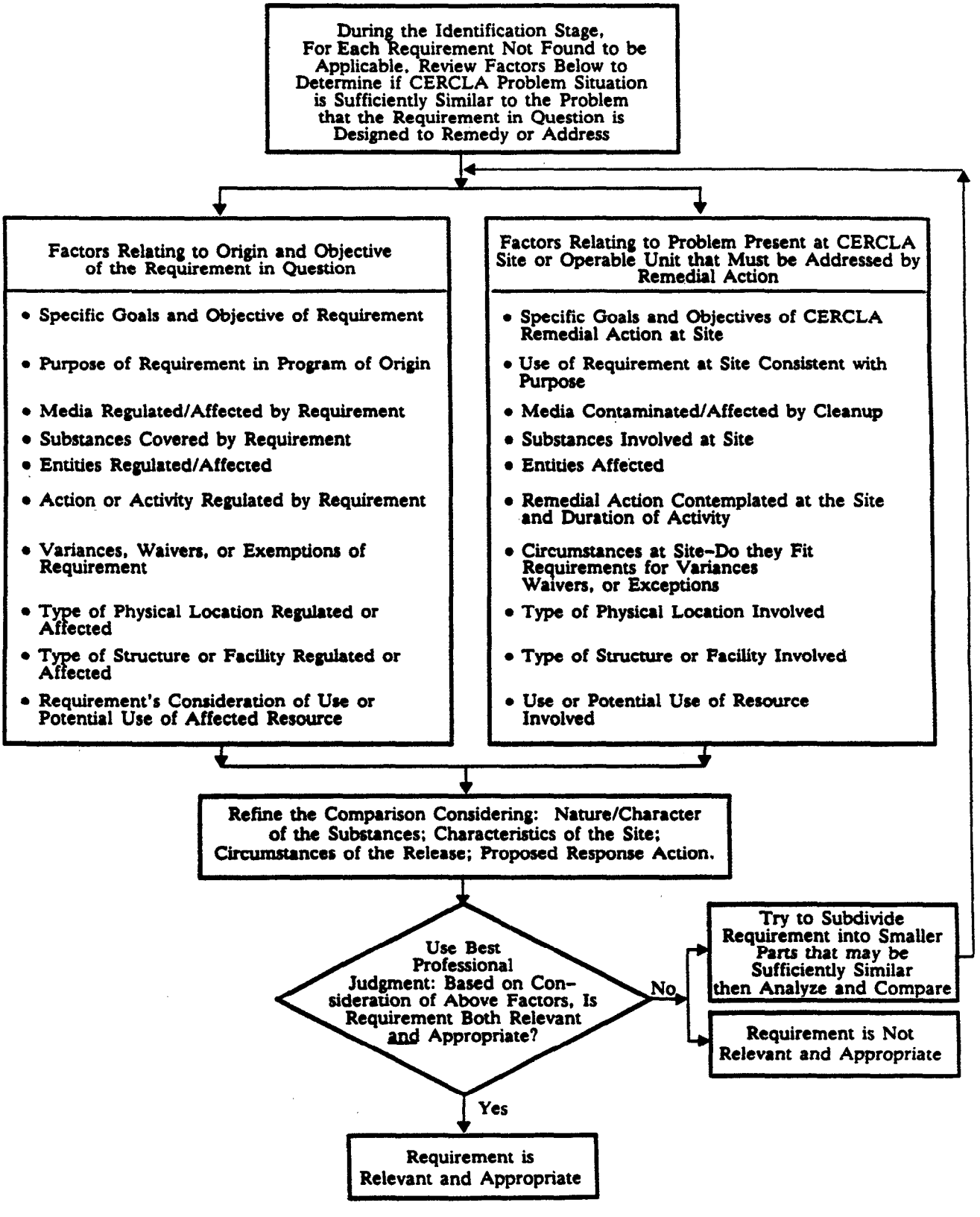
Exhibit 1-7 outlines the general procedure and factors to consider in determining whether a requirement is relevant and appropriate. The factors listed in the left-hand column relate to the problem that the requirement is designed to address or to the goal that the requirement is intended to attain; the factors in the right-hand column relate to the problem present at the CERCLA site and the objective of the remedial action. The relative importance of these factors will vary from site to site depending on the kind of ARARs under consideration (chemical-, action-, or location-specific), and on site-specific conditions.

Both sets of factors in Exhibit 1-7 should be defined narrowly. For example, the goal of both RCRA corrective action requirements and the CERCLA cleanup might be defined as protection of human health and the environment. However, in analyzing whether the corrective action requirements are relevant and appropriate, such a definition of goals would be too broad. Instead, the goal of the RCRA corrective action requirement might be characterized as the cleanup of a plume of ground-water contamination from a distinct source. This would be compared to the goal of the CERCLA action, such as cleanup of area-wide ground-water contamination.

Determining whether a requirement is both relevant and appropriate is essentially a two step process. First, the determination focuses on whether a requirement is relevant based on a comparison between the action, location, or chemicals covered by the requirement and related conditions of the site, the release, or the potential remedy. This step should be a screen which will determine the relevance of the potentially relevant and appropriate requirement under consideration. The second step is to determine whether the requirement is appropriate by further refining the comparison, focusing on the nature/characteristics of the substances, the characteristics of the site, the circumstances of the release, and the proposed remedial action.

Exhibit 1-7

General Procedure for Determining if Requirement is Relevant and Appropriate



A requirement may be relevant but not appropriate for the specific site. Only those requirements that are determined to be both relevant and appropriate must be complied with. A requirement may be found relevant because it closely matches the site on some of the factors listed in Exhibit 1-7, but may not be appropriate because the site circumstances differ significantly on other key factors. While some requirements within a regulation will be relevant and appropriate, other requirements in that same regulation may be relevant (in that they address in a broad sense the same problem as is faced at the CERCLA site), but not appropriate because the requirement is not well-suited to the circumstances at the CERCLA site, or to the threat to human health and the environment posed by the circumstances of the release.

In comparing the requirement and the site circumstances or the circumstances of the release, some of the following factors from Exhibit 1-7 and related considerations might be particularly important in determining whether a requirement is appropriate:

- the purpose of the requirement;
- the physical characteristics (size/nature) of the site and contamination;
- the character and circumstances of the release at the site compared to what the requirement was intended to address and requires;
- the substances covered by the requirement (e.g.,the chemical characteristics, form or concentration of the contamination or release for which the requirement was designed);
- the duration of the activity;
- the basis for a waiver or exemption;

In addition, one should consider:

- whether another requirement is available that more fully matches the circumstances at the site; and
- where EPA has explicitly decided that a requirement is not appropriate to a situation, that requirement will not be appropriate for such a situation at a CERCLA site.

Portions of a requirement may be relevant and appropriate even if a requirement in its entirety is not. For example, parts of the requirements for design and operation of a waste pile found in 40 CFR §264.251, such as the requirement to use a liner of sufficient strength and thickness to prevent failure due to pressure gradients, might be considered relevant and appropriate, while that portion of the design requirements calling for installation of a liner covering all surrounding earth likely to be in contact

with the waste might not be appropriate if such earth is already contaminated and the eventual remedy is to remove all of that earth.

When the analysis results in a determination that a requirement is both relevant and appropriate, such a requirement must be complied with to the same degree as if it were applicable.

Included below are several examples of situations where requirements might be relevant but not appropriate:

1. A requirement may be relevant to the particular site because it addresses a similar type of facility or entity, but not appropriate because of differences in the duration of the activity. For example, the RCRA requirements for secondary containment of tanks and other storage units may not be appropriate for temporary, short-term storage.

2. Many RCRA requirements are designed to apply to specific types of discrete units. These requirements may be relevant because they address the same wastes and activities, such as closure of hazardous wastes in a landfill, but may be inappropriate because of the physical size of the contamination at the CERCLA site. For example, although they may be appropriate for smaller areas, the requirements for capping may not be appropriate in some circumstances for large dispersed areas of low-level soil contamination such as may be found at many large municipal facilities.

3. A requirement may also be found relevant but not appropriate when another requirement is available that has been designed to apply to that specific situation, reflecting an explicit decision about the requirements appropriate to that situation. For example, the Agency has made a determination under RCRA that Subtitle C is not an appropriate means of regulating on a national basis certain mining waste from the extraction or beneficiation of ores and minerals (51 FR 24496, July 3, 1986). Therefore, since that explicit, formal determination has been made, Subtitle C requirements will generally not be relevant and appropriate to these wastes from extraction or beneficiation of ores and minerals.

4. RCRA regulations affecting disposal or landfill closure require the site to be capped with a final cover designed and constructed to provide long-term minimization of the migration of liquids through the capped area. However, such requirements related to the need for an impermeable cover may not be appropriate in some circumstances if the wastes are largely immobile, and there will be no direct contact threat.

5. A location-specific requirement may prohibit prospectively the deposit of certain substances in a floodplain. This prohibition may be appropriate with regard to remedial options in considering whether to create new disposal units in the floodplain. However, it is not likely to be appropriate to remove large existing landfills from the floodplain.

6. MCLs (under RCRA and under SDWA) are relevant and appropriate to remediation of ground water that may be used for drinking. However, MCLs are

generally not appropriate where ground water is not potentially drinkable due to widespread naturally occurring contamination or due to location in a large industrial area with substantial contamination where there is no actual, planned, or potential use of ground water for drinking.[19] In addition, MCLs are generally not appropriate for site-specific circumstances where a well would never be placed and ground water would thus never be consumed (e.g., a twenty-foot strip of land between the toe of a landfill and a river, if there is no surface water contamination resulting from man-made ground-water contamination at the site).

Not all of the specific factors listed in Exhibit 1-7 will need to be considered in determining whether a requirement is relevant and appropriate. Only the pertinent factors need be considered. For chemical-, location-, and action-specific requirements, the following factors should generally be considered:

Chemical-Specific

Specific Goal and Objective of Requirement	Specific Goals and Objective of CERCLA Remedial Action at Site
Purpose of Requirement in Program of Origin	Use of Requirement at Site Related to Purpose
Substances Covered by Requirement	Substances Involved at Site
Media and Entities Regulated/ Affected/Protected by Requirement	Media and Entities Potentially/ Actually Contaminated/ Affected by Cleanup
Variances, Waivers or Exemptions of Requirements	Circumstances at Site -- Do they Fit Requirements for Variance, Waiver, or Exemption or Otherwise Contradict some Implicit Assumption Underlying the Requirement
Requirement's Consideration of Use or Potential Use of Affected Resource	Use or Potential Use of Resource Involved

[19] Ground water in such industrial area (where there is no actual, planned, or potential use of ground water for drinking) would still be classified as Class IIB aquifers, although MCLs may be determined to be relevant and appropriate.

Location-Specific

Specific Goal and Objective of Requirement	Specific Goals and Objective of CERCLA Remedial Action at Site
Purpose of Requirement in Program of Origin	Use of Requirement at Site Related to Purpose
Type of Physical Location Regulated or Affected	Location Involved
Action or Activity Prohibited/Required by Requirement Activity	Remedial Action Contemplated at Site and Duration of
Variances, Waivers or Exemptions	Circumstances at Site -- Do they Fit Requirements for Variance, Waiver, or Exemption
Requirement's Consideration of Use or Potential Use of Affected Resource	Use or Potential Use of Resource Involved

Action-Specific

Specific Goal and Objective of Requirement	Specific Goals and Objective of CERCLA Remedial Action at Site
Purpose of Requirement in Program of Origin	Use of Requirement at Site Related to Purpose
Substances Covered by Requirement	Substances Involved at Site
Media and Entities Regulated/ Affected/Protected by Requirement	Media and Entities Potentially/ Actually Contaminated/ Affected by Cleanup
Action or Activity Regulated by Requirement	Remedial Action Contemplated at Site and Duration of Activity
Variances, Waivers or Exemptions	Circumstances at Site -- Do they Fit Requirements for Variance, Waiver, or Exemption
Type and Size of Facility, Unit, Release (e.g. Size of Release) Regulated or Affected	Type and Size of Facility Unit, Release Involved

Requirement's Consideration of Use or Potential Use of Affected Resource	Use or Potential Use of Resource Involved

1.3 CERCLA WAIVER CRITERIA FOR ARARS

CERCLA §121 provides that under certain circumstances an otherwise applicable or relevant and appropriate requirement may be waived. These waivers apply only to meeting ARARs with respect to remedial actions on-site; other statutory requirements, such as that remedies be protective of human health and the environment, cannot be waived. A waiver must be invoked for each ARAR that will not be attained or exceeded. The waivers provided by CERCLA §121(d)(4), some circumstances under which each waiver might be invoked, and criteria for invoking the waivers are discussed below.

1. Interim Measures

> [T]he remedial action selected is only part of a total remedial action that will attain such level or standard of control when completed. (CERCLA §121(d)(4)(A).)

This waiver may be applicable to interim measures that are expected to be followed within a reasonable time by complete measures that will attain ARARs. The interim measures waiver may apply to sites at which a final site remedy is divided into several smaller actions.

For example, the selected remedy at a site may include excavation and treatment of the source. However, the treatment method may require treatability testing or time for set-up or construction. During this time, an interim measure involving stabilization, such as a cap, of the source may be appropriate. In such a circumstance, the interim measure waiver would allow the present stabilization actions at the site to constitute the initial components of a phased remedial response. These actions would not be required to attain landfill closure ARARs under RCRA because the response would not be complete.

The factors that may be appropriate for invoking this waiver include:

- Potential for exacerbation of site problems. The interim measure should not directly cause additional migration of contaminants, complicate the site cleanup, or present an immediate threat to public health or the environment; and

- Non-interference with final remedy. The interim measure selected must not interfere with, preclude, or delay the final remedy, consistent with EPA's priorities for taking further action.

2. Greater Risk to Health and the Environment.

> [C]ompliance with such requirement at the facility will result in greater risk to human health and the environment than alternative options. (CERCLA §121(d)(4)(B).)

This waiver may be invoked for an ARAR that can only be met by using remedial action that, because it meets that ARAR, poses greater risks than a similar remedial alternative that does not meet that ARAR. This waiver could be used to "salvage" a remedial action option that would cause greater environmental damage or health risks solely because that option had to meet all ARARs, especially where one ARAR causes the problem. For example, attaining the ambient concentration level for PCBs spread throughout river sediment might require widespread dredging of the sediments, causing an unacceptable release of the pollutant to the water body and damaging or disrupting the ecosystem. Waiving the ARAR for ambient PCB concentrations in the sediment would eliminate the need to conduct such harmful dredging.

Meeting an ARAR could also pose greater risks to workers or residents. For example, excavation of a particularly toxic, volatile, or explosive waste to meet an ARAR could pose high short-term risks. If protective measures were not practicable, then use of this waiver might be appropriate.

Specific factors that may be considered in invoking the waiver for preventing greater risks include:

- Magnitude of adverse impacts. The risk posed or the likelihood of present or future risks posed by the remedy using the waiver should be significantly less than that posed by the totally compliant remedy posing the risk;

- Duration of adverse impacts. The more long lasting the risks from the totally compliant remedy, the more this waiver becomes appropriate; and

- Reversibility of adverse impacts. This waiver is especially appropriate if the risks posed by meeting the ARAR could cause irreparable damage.

Remedies protective of human health and the environment but not meeting all ARARs should be compared to the remedy meeting ARARs that causes the minimum adverse impacts. The additional public health and environmental benefits of not meeting all ARARs must be weighed against the adverse impacts caused by not doing so. Only the ARARs that cause the greater risk are eligible to be waived.

3. Technical Impracticability

> [C]ompliance with such requirement is technically impracticable from an engineering perspective. (CERCLA §121(d)(4)(C).)

The term "impracticable" implies an unfavorable balance of engineering feasibility and reliability. The term "engineering perspective" used in the statute implies that cost, although a factor, is not generally the major factor in the determination of technical impracticability. A remedial alternative that is feasible might be deemed technically impracticable if it could only be accomplished at an inordinate cost. For instance, attainment of an ARAR might be possible, but constant maintenance problems might require such an exorbitant amount of money that the alternative would not be considered reliable, and thus would be infeasible from an engineering perspective.

Furthermore, the use of the term "impracticable" implies that remedies that are not demonstrated but that are thought to be feasible cannot be eliminated because of this waiver. Thus, this waiver may be used for cases where: (1) neither existing nor innovative technologies can reliably attain the ARAR in question, or (2) attainment of the ARAR in question would be illogical or infeasible from an engineering perspective.

The technical impracticability waiver may be invoked when either of the following specific criteria are met:

- Engineering feasibility. The current engineering methods necessary to construct and maintain an alternative that will meet the ARAR cannot reasonably be implemented.

- Reliability. 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.

4. Equivalent Standard of Performance

> [T]he remedial action selected will attain a standard of performance that is equivalent to that required under the otherwise applicable standard, requirement, criteria, or limitation, through use of another method or approach. (CERCLA §121(d)(4)(D).)

This waiver may be used in situations where an ARAR stipulates use of a particular design or operating standard, but equivalent or better remedial results (e.g., contaminant levels or reliability) could be achieved using an alternative design or method of operation. For instance, an alternative may involve reduction of either the mobility or toxicity of a hazardous substance through a specified form of treatment. The waiver may be invoked where a substitute form of treatment from that specified or required in the ARAR (e.g., fixation instead of incineration) achieves comparable reductions in either mobility or toxicity.

The CERCLA Reauthorization Conference Committee's Statement of Managers makes the following point with regard to this waiver:

> Subsection [121] (d)(4)(D) allows the selection of a remedial action that does not comply with a particular Federal or State standard or requirement of environmental law, where an alternative provides the same level of control as that standard or requirement through an alternative means of control. This allows flexibility in the choice of technology but does not allow any lesser standard or any other basis (such as a risk-based calculation) for determining the required level of control. However, an alternative standard may be risk-based if the original standard was risk-based.

The following specific factors may be considered in deciding whether to invoke this waiver:

- The time required to achieve beneficial results using the alternative remedy is equal to or less than the original ARAR. An alternative that achieved similar results in significantly less time should be considered as advantageous;

- Degree of protection of health, welfare, and the environment (e.g., environmental concentration achieved) is equal to or greater than that under the original ARAR;

- Level of performance achieved compared to that specified in the ARAR (e.g., concentration of residuals); and

- Reliability of the remedy. The potential for the alternative ARAR to continue to be protective into the future is equal to or greater than that afforded by the ARAR to be waived.

5. <u>Inconsistent Application of State Requirements</u>

> [W]ith respect to a State standard, requirement, criteria, or limitation, the State has not consistently applied (or demonstrated the intention to consistently apply) the standard, requirement, criteria, or limitation in similar circumstances at other remedial actions. (CERCLA §121(d)(4)(E).)

This waiver is intended to prevent unjustified or unreasonable restrictions from being imposed on cleanups. The issues raised by this waiver are closely tied to those involved in the definition of "promulgated."

This waiver may be used in two situations. First, State requirements may have been developed and promulgated but never applied because of a lack of applicability in past situations. Such requirements should not be applied in CERCLA actions where there is evidence that the State does not intend to apply them. Second, State standards that have been variably applied or inconsistently enforced may give reason to invoke the inconsistent application waiver. A standard is presumed to have been consistently applied unless there is evidence to the contrary.

Consistency of application may be determined by:

- o Similarity of sites or response circumstances (nature of contaminants or media affected, characteristics of waste and facility, degree of danger or risk, other hazardous waste management programs, etc.);
- o Proportion of non-compliance cases (including enforcement actions);
- o Reason for non-compliance;
- o Intention to consistently apply future requirements as demonstrated by policy statements, legislative history, site remedial planning documents, or State responses to Federal-lead sites; newly promulgated requirements shall be presumed to embody this intention unless there is contrary evidence.

6. Fund Balancing

[I]n 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. (CERCLA §121(d)(4)(F).)

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 action at other sites would be jeopardized. (Even with this waiver, the remedy must still comply with the statutory requirement to be protective of human health and the environment).

The following criteria may be considered when invoking the Fund-balancing waiver for ARARs:

- o The cost of implementing a remedy that would attain the ARAR in question.
- o The availability of amounts in the Fund to respond to other sites (includes consideration of the number of sites and expected cost of remediation) is not adequate because attainment of the ARAR would reduce the availability of Fund monies for other sites. Projections should show that significant threats from other sites may be addressed under the current Fund if the ARAR were not attained.

1.4 OTHER CRITERIA OR GUIDELINES TO BE CONSIDERED (TBCs)

In addition to legally binding laws and regulations, many Federal and State environmental and public health programs also develop criteria, advisories, guidance, and proposed standards that are not legally binding, but that may provide useful information or recommended procedures. These materials are not potential ARARs but are evaluated along with ARARs, as part of the risk assessment conducted for each CERCLA site, to set protective cleanup level targets. Chemical-specific TBC values such as health advisories and reference doses will be used in the absence of ARARs or where ARARs are not sufficiently protective to develop cleanup goals. In addition, other TBC materials such as guidance or policy documents developed to implement regulations may be considered and used as appropriate, where necessary to ensure protectiveness. The TBC values and guidelines may be used as appropriate.[20] After the risk assessment has been conducted, if no ARARs address a particular situation, or if existing ARARs do not ensure protectiveness, to-be-considered advisories, criteria, or guidelines should be used to set cleanup targets. Note that it may be necessary in the risk assessment to express the TBC values in different units (e.g., daily intake) in order to apply them. For instance, TBC values expressed as dosages may have to be converted to concentration levels before they can be used.

Exhibit 1-10 at the end of this chapter lists other Federal criteria, advisories, guidance, and standards that should be considered. EPA is not aware of any comprehensive listing of State TBCs, which should nevertheless be evaluated for use in a particular site cleanup. Exhibit 1-8 outlines a procedure for determining when such material should be used. The basic criterion is whether use of the material to be considered is necessary to protect public health or the environment at a CERCLA site. For example, although Health Effects Advisories (HEAs) are not legally binding standards, and may not be fully current, they may provide the best available standard for a particular chemical for which no binding standard exists. In that case, the HEA should be evaluated using the procedures in the Superfund Public Health Evaluation Manual, and if the standard is necessary to achieve a protective remedy it should be used.

TBCs should only be used in setting protective cleanup levels after ascertaining that they have not been superceded. For specific TBC values, and related explanatory material and EPA contacts, consult the EPA Integrated Risk Information System (IRIS).. IRIS is a computer-based catalogue of EPA risk assessment and risk management information for chemical risk assessment and risk management information for chemical substances, accessible through the Agency's electronic mail system.[21]

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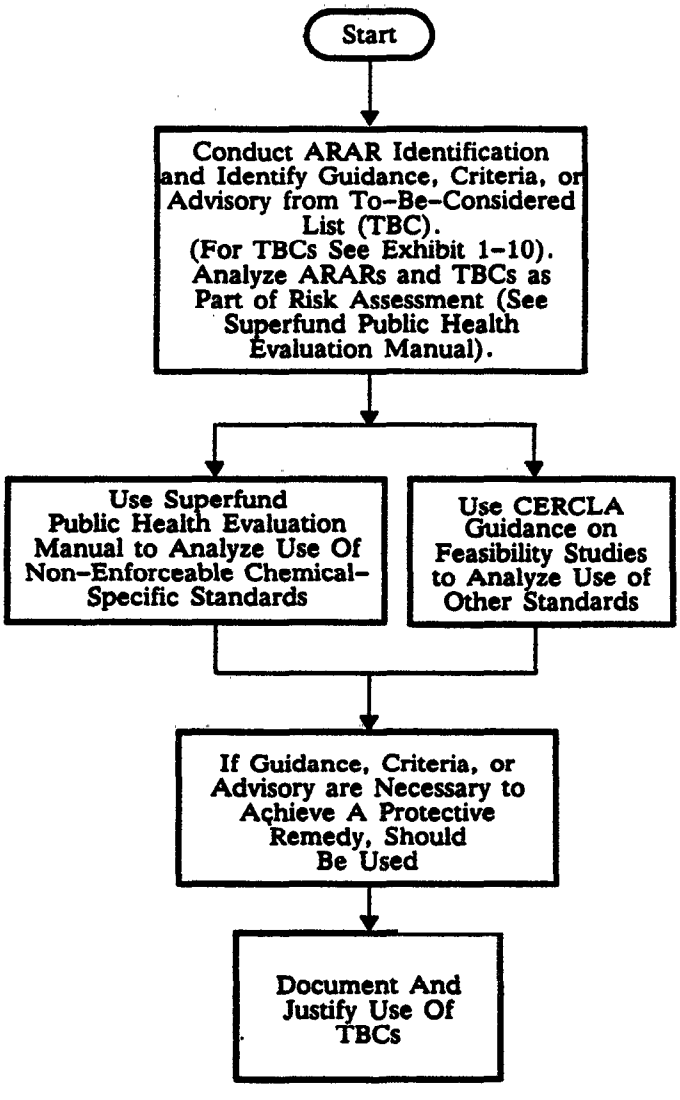
[20] See the discussion of risk assessment in Section 1.2.3.1 above and The Superfund Public Evaluation Manual (October 1986; 9285.4-1)

[21] Training is available. For general questions, contact the IRIS coordinator at FTS 382-7315.

Exhibit 1-8
General Procedure for Determining if Guidance or Criteria Should be Considered



1.5 DOCUMENTATION

Guidance provided in this manual on ARAR and TBC documentation updates and supersedes other sources such as the Guidance on Feasibility Studies Under CERCLA (April 1985), materials distributed at ROD workshops, and the Preamble to the NCP (November 1985). Detailed documentation of ARARs, as described below, should be provided in an Appendix to the RI/FS Report, and a summary included in the ROD. When revised, the RI/FS guidance and the ROD guidance currently being developed will discuss specific guidelines, and this manual will be revised where necessary.

The following documentation should always be supplied in an Appendix to the RI/FS Report in the discussion of the analysis of Federal and State ARARs:

- Documentation should provide a rationale for the decision that a chemical-, location-, or action-specific requirement is applicable, or is relevant and appropriate for that specific site, for each remedial action alternative that passed through the screening and into detailed analysis.[22] The rationale should include an explanation of the analysis leading to the determination of applicability, or relevance and appropriateness. If more than one requirement is determined to be ARAR in connection with the same substance, action, or site-specific condition, and if the standards are inconsistent or in conflict, the general rule is to comply with the most stringent requirement.

- When an alternative is chosen that does not attain an ARAR, the basis for waiving the requirement must be fully documented and explained.

- Documentation may also be appropriate in some cases when a potential ARAR is initially identified but ultimately is found not to be ARAR. For example, information may become available late in the RI/FS phase of the project that changes the status of a requirement from ARAR to not ARAR. When a requirement is expected to be ARAR, and the determination is difficult, the factors indicating why the standard was not ARAR should be stated and explained in sufficient detail so that the basis for the decision can be understood by a later reviewer.

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[22] Note that chemical-specific ARARs will generally be the same for all alternatives. A single list of chemical-specific ARARs should be developed and modified during the remedy selection process. In most cases, documentation of the identification of chemical-specific ARARs need not be repeated for each alternative.

The following documentation should be provided in an Appendix to the RI/FS Report for the analysis of other Federal and State criteria, advisories, guidance, and proposed standards to be considered (TBCs).

- If no potential ARARs are identified covering a particular situation, or if potential ARARs are determined not to be protective, any pertinent criteria, advisories, guidance, or proposed standards should be used, and the reasons for their use should be fully documented.

- Documentation need not be provided for negative determinations related to TBCs. That is, reasons for determining that to-be-considered standards are not pertinent do not need to be documented.

In addition to the circumstances specified above, documentation should be provided for both ARARs and to-be-considered standards in every case in which, in the decision-maker's judgment, the documentation would strengthen the RI/FS Report and the ROD.

EXHIBIT 1-9

UNIVERSE OF APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS a/

1. Office of Solid Waste

o Resource Conservation and Recovery Act of 1976 (42 U.S.C. 6901) b/

a. 40 CFR Part 264, applicable for permitted facilities c/, and 40 CFR Part 265, for interim status facilities.

-- Ground-water Protection (40 CFR 264.90-264.101)
-- Ground-water Monitoring, Subpart F (40 CFR 264.98-264.100) d/
-- Closure and Post-Closure (40 CFR 264.110-264.120, 265.110-265.120)
-- Containers (40 CFR 264.170-264.178, 265.190-265.177)
-- Tanks (40 CFR 264.190-264.200, 265.190-265.199)
-- Surface Impoundments (40 CFR 264.220-264.249, 265.220-265.230)
-- Waste Piles (40 CFR 264.250-264.269, 265.250-265.258)
-- Land Treatment (40 CFR 264.270-264.299, 265.270-265.282)
-- Incinerators (40 CFR 264.340-264.999, 265.340-265.369)
-- Land Disposal Restrictions (40 CFR 268.1-268.50)
-- Dioxin-containing Wastes (50 FR 1978). Includes the final rule for the listing of dioxin-containing waste.

b. Statutory requirements, including:

-- Liquids in Landfills (RCRA §3004(c))
-- Minimum Technology Requirements (RCRA §3004(o), 3005(j))
-- Dust Suppression (RCRA §3004(e))
-- Hazardous Waste Used as Fuel (RCRA §3004(q))

c. Open Dump Criteria - pursuant to RCRA Subtitle D: criteria for classification of solid waste disposal facilities (40 CFR Part 257). Note: For nonhazardous wastes.

2. Office of Water

o The Safe Drinking Water Act (42 U.S.C. 300(f))

a. Maximum Contaminant Levels (chemicals, turbidity, and microbiological contamination) (for drinking water or human consumption) (40 CFR 141.11-141.16).

b. Maximum Contaminant Level Goals (40 CFR 141.50-141.51, 50 FR 46936)

c. Underground Injection Control Regulations (40 CFR Parts 144, 145, 146, 147).

o Clean Water Act (33 U.S.C. 1251)

Requirements established pursuant to sections 301 (effluent limitations), 302 (effluent limitations), 303 (water quality standards, including State water quality standards), 304 (Federal water quality criteria), 306 (national performance standards), 307 (toxic and pretreatment standards, including Federal pretreatment standards for discharge into publicly owned treatment works, and numeric standards for toxics), 402 (national pollutant discharge elimination system), 403 (ocean discharge criteria), and 404 (dredged or fill material) of the Clean Water Act, (33 CFR Parts 320-330, 40 CFR Parts 122, 123, 125, 131, 230, 231, 233, 400-469). Available ambient Water Quality

* * * AUGUST 8, 1988 DRAFT * * *

EXHIBIT 1-9
(Continued)

UNIVERSE OF APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Criteria Documents are listed at 45 FR 79318, November 28, 1980; 49 FR 5831, February 15, 1984; 50 FR 30784, July 29, 1985; 51 FR 22978, June 28, 1986; 51 FR 43665, December 3, 1986; 51 FR 8012, March 7, 1986; 52 FR 6213, March 2, 1987.

- Marine Protection, Research, and Sanctuaries Act (33 U.S.C. 1401)
- Ocean Dumping Requirements (40 CFR Parts 220-233, Subchapter H)
- Discharge of dredged materials into ocean, (33 CFR Parts 320-329, 40 CFR Parts 122, 123, 125, 131, 230, 231, 233, 400-469). Incineration at sea requirements (40 CFR Parts 220-225, 227, 228). See also 40 CFR 125.120-125.124.
- Section 10 of the Rivers and Harbors Act prohibits unauthorized obstruction or alteration of navigable waters (33 CFR Parts 320-329, 40 CFR Parts 122, 123, 125, 131, 230, 231, 233, 400-469).
- EPA's Statement of Procedures on Floodplains Management and Wetlands Protection. (40 CFR Part 6 Appendix A) f/

3. Office of Pesticides and Toxic Substances

- Toxic Substances Control Act (15 U.S.C. 2601)

  a. PCB Requirements Generally: 40 CFR Part 761; Manufacturing Processing, Distribution in Commerce, and Use of PCBs and PCB items (40 CFR 761.20-761.30); Marking of PCBs and PCB items (40 CFR 761.40-761.45); Storage and Disposal (40 CFR 761.60-761.79); Records and Reports (40 CFR 761.180-761.185). See also 40 CFR 129.105, 750.

  b. Disposal of Waste Material Containing TCDD (40 CFR 775.180-775.197).

4. Office of Air and Radiation

- The Uranium Mill Tailings Radiation Control Act of 1978 (42 U.S.C. 2022)

  Uranium mill tailing rules - Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings, (40 CFR Part 192).

- Clean Air Act (42 U.S.C. 7401)

  a. National Ambient Air Quality Standards (40 CFR Part 50)

  b. Standards for Protection Against Radiation - high and low level radioactive waste rule, (10 CFR Part 20).

  c. National Emissions Standards for Hazardous Air Pollutants for Asbestos and Wet Dust particulates, (40 CFR 61.140-61.156), for Beryllium (40 CFR 61.30-61.34), for Vinyl Chloride (40 CFR 61.60-61.71), for Benzene (40 CFR 61.110-61.112), and for other hazardous substances (40 CFR Part 61 generally). See also effluent limitations and pretreatment standards for Wet Dust Collection (40 CFR 427.110-427.116) and 40 CFR Part 763.

  d. National Emissions Radionuclides (40 CFR Part 61, 10 CFR 20.101-20.108)

  e. State implementation plans for national primary and secondary ambient air quality control standards (42 U.S.C. 7410)

UNIVERSE OF APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

f. Standards of performance for new stationary sources, including new incinerators (42 U.S.C. 7411), (40 CFR Part 60).

5. Other Federal Requirements

- o OSHA requirements for workers engaged in response or other hazardous waste operations (29 CFR 1910.120).
- o Occupational Safety and Health Act of 1970 (29 U.S.C. 651).

  a. Occupational Safety and Health Standards (General Industry Standards) (29 CFR Part 1910).

  b. The Safety and Health Standards for Federal Service Contracts (29 CFR Part 1926).

  c. The Shipyard and Longshore Standards (29 CFR parts 1915, 1918).

  d. The Health and Safety Standards for Employees engaged in Hazardous Waste Operations. (50 FR 45654)

- o National Historic Preservation Act, 16 U.S.C. 470. Protection of Archaeological Resources: Uniform Regulations -- Department of Defense (32 CFR Part 229, 229.4), Department of the Interior (43 CFR Part 7, 7.4).
- o Federal Land Policy and Management Act, 13 U.S.C. 1700. (Establishes requirements concerning utilization of public lands, particularly rights of way regulation (13 U.S.C. 1761), land use planning and land acquisition and disposition (13 U.S.C. 1711), and appropriation of waters on public lands.
- o Department of Transportation Rules for the Transportation of Hazardous Materials, 49 CFR Parts 107, 171.1-172.558.
- o Endangered Species Act of 1973, 16 U.S.C. 1531. (Generally, 50 CFR Parts 81, 225, 402).
- o Wild and Scenic Rivers Act, 16 U.S.C. 1271.
- o Fish and Wildlife Coordination Act, 16 U.S.C. 661 note.
- o Fish and Wildlife Improvement Act of 1978, and Fish and Wildlife Act of 1956, 16 U.S.C. 742a note. a/
- o Fish and Wildlife Conservation Act of 1980, 16 U.S.C. 2901. (Generally, 50 CFR Part 83). a/
- o Coastal Zone Management Act of 1972, 16 U.S.C. 1451. (Generally, 15 CFR Part 930 and 15 CFR 923,45 for Air and Water Pollution Control Requirements).
- o Farmland Protection Policy Act, 7 U.S.C. 4201. (Generally, 7 CFR Part 658). a/
- o Rivers and Harbors Act (33 U.S.C 403)

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a/ This is the list of potentially applicable or relevant and appropriate requirements found in the October 2, 1985, Compliance Policy with additions. As additional requirements are promulgated, they must also be considered potentially applicable or relevant and appropriate and added to this list.

b/ In authorized States, Federal regulations promulgated under RCRA are not applicable as a State requirement until the State adopts those regulations through its own legislative process, but probably would be relevant and appropriate as a Federal requirement. Federal

EXHIBIT 1-9
(Continued)

UNIVERSE OF APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

regulations promulgated pursuant to the Hazardous and Solid Waste Amendments of 1984, however, are effective immediately in all 50 States, and are potentially applicable as Federal requirements.

c/ 40 CFR Part 264 regulations apply to permitted facilities and may be relevant and appropriate to other facilities.

d/ Only the Subpart F ground-water monitoring requirements under 40 CFR 264 are ARAR. The Subpart F ground-water monitoring requirements under 40 CFR 265 are not ARAR.

e/ May not be applicable or relevant for many sites.

f/ 40 CFR Part 6 Subpart A sets forth EPA policy for carrying out the provisions of Executive Orders 11988 (Floodplains Management) and 11990 (Protection of Wetlands).

EXHIBIT 1-10

OTHER FEDERAL AND STATE CRITERIA, ADVISORIES, AND GUIDANCE TO BE CONSIDERED a/

1. Federal Criteria, Advisories, and Procedures

- o Health Effects Assessments (HEAs) and Proposed HEAs, ("Health Effects Assessment for (Specific Chemicals), "ECAO, USEPA, 1985).
- o References Doses (RFDs), ("Verified Reference Doses of USEPA," ECAO-CIN-475, January 1986). See also Drinking Water Equivalent Levels (DWELs), a set of medium-specific drinking water levels derived from RFDs. (See USEPA Health Advisories, Office of Drinking Water, March 31, 1987)
- o Carcinogen Potency Factors (CPFs) (e.g., Q1 Stars, Carcinogen Assessment Group [CAG] Values), (Table 11, "Health Assessment Document for Tetrachloroethylene (Perchloroethylene)," USEPA, OHEA/6008-82/005F, July 1985).
- o Pesticide registrations and registration data.
- o Pesticide and Food additive tolerances and action levels. Note: Some tolerances and action levels may pertain and should therefore be considered in certain situations.
- o Waste load allocation procedures, EPA Office of Water (40 CFR Part 125, 130).
- o Federal Sole Source Aquifer requirements (See 52 FR 6873, March 5, 1987).
- o Public health criteria on which the decision to list pollutants as hazardous under Section 112 of the Clean Air Act was based.
- o Guidelines for Ground-Water Classification Under the EPA Ground-Water Protection Strategy.
- o TSCA chemical advisories (4 issued to date: Nitrosamines (September, 1984), P/Tert/Buti/benzoic acid (March, 1985), Burning used oil & space heaters (November, 1985), 4-4 Methylinebis [2/Chloroanaline] (December, 1986), 2 Nitropropane (December 1986).
- o Advisories issued by FWS and NMFS under the Fish and Wildlife Coordination Act.
- o TSCA Compliance Program Policy, ("TSCA Enforcement Guidance Manual - Policy Compendium," USEPA, OECM, OPTS, March, 1985).
- o OSHA health and safety standards that may be used to protect public health (non-workplace).

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a/ This list updates the list of other Federal criteria, advisories, and guidance to be considered in the October 5, 1985, Compliance Policy. As additional or revised criteria, advisories, or guidance are issued, they should be added to this list and also considered.

b/ Proposed amendments to the Federal Insecticide, Fungicide and Rodenticide Act introduced the concept of Ground Water Residue Guidance Levels (GRGLs). These amendments have not been passed by Congress and a list of GRGLs has not yet been promulgated.

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EXHIBIT 1-10
(Continued)

OTHER FEDERAL AND STATE CRITERIA, ADVISORIES, AND GUIDANCE TO BE CONSIDERED

- Health Advisories, EPA Office of Water.
- EPA Water Quality Advisories, EPA Office of Water, Criteria and Standards Division.

2. USEPA RCRA Guidance Documents

- Interim Final Alternate Concentration Limit Guidance Part I: ACL Policy and Information Requirements (July, 1987)

a. EPA's RCRA Design Guidelines

(1) Surface Impoundments, Liners Systems, Final Cover and Freeboard Control.

(2) Waste Pile Design - Liner Systems.

(3) Land Treatment Units.

(4) Landfill Design - Liner Systems and Final Cover.

Permitting Guidance Manuals c/

(1) Permit Writer's Guidance Manual for Hazardous Waste Land Treatment, Storage and Disposal Facilities, Phase I; (February 15, 1985) EPA/530-SW-85-024.

(2) Permit Writer's Guidance Manual for Subpart F. (October, 1983)

(3) Permit Applicant's Guidance Manual for the General Facility Standards. (October 15, 1983) EPA # OSW 00-00-968

(4) Waste Analysis Plan Guidance Manual. (October 15, 1984) EPA/530-SW-84-012

(5) Permit Writer's Guidance Manual for Hazardous Waste Tanks. (July 1983)

(6) Model Permit Application for Existing Incinerators. (1985)

(7) Guidance Manual for Evaluating Permit Applications for the Operation of Hazardous Waste Incinerator Units. (July 1983)

(8) A Guide for Preparing RCRA Permit Applications for Existing Storage Facilities. (January 15, 1982)

(9) Guidance Manual on closure and post-closure Interim Status Standards.

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c/ RCRA permit manuals are listed to indicated the kind of information used, manner of interpreting information, and determinations in setting standards; they are not used to indicate procedures.

EXHIBIT 1-10
(Continued)

OTHER FEDERAL AND STATE CRITERIA, ADVISORIES, AND GUIDANCE TO BE CONSIDERED

c. Technical Resource Documents (TRDs)

(1) Evaluating Cover Systems for Solid and Hazardous Waste. (September 1982) EPA OSW-00-00-867

(2) Hydrologic Simulation of Solid Waste Disposal Sites. (November 1982) EPA OSW-00-00-868

(3) Landfill and Surface Impoundment Performance Evaluation. (April 1983) EPA OSW-00-00-869

(4) Draft Minimal Technology Guidelines on Double Liner System for Landfills and Surface Impoundments. (May 1985) PB 87151072-AS

(5) Draft Minimal Technology Guidelines on Single Liner System for Landfills and Surface Impoundments. (May 1985) PB 871173159

(6) Management of Hazardous Waste Leachate. (September 1982) OSW-00-00-871

(7) Guide to the Disposal of Chemically Stabilized and Solidified Waste. (1982) EPA/530-SW-872

(8) Closure of Hazardous Waste Surface Impoundments. (September 1982) OSW-00-00-873

(9) Hazardous Waste Land Treatment. (April 1983) OSW-00-00-874

(10) Soil Properties, Classification, and Hydraulic Conductivity Testing. (March 1984) OSW-00-00-925, OSWER directive 9480.00-7D

d. Test Methods for Evaluating Solid Waste

(1) Solid Waste Leaching Procedure Manual. (1984) OSW-00-00-924

(2) Methods for the Prediction of Leachate Plume Migration and Mixing

(3) Hydrologic.Evaluation of Landfill Performance (HELP) Mode, Volumes I and II (1984), EPA/530-SW-84-009 & EPA/530-SW-84-010

(4) Hydrologic Simulation on Solid Waste Disposal Sites. (November 1982) EPA OSW-00-00-868

(5) Procedures for Modeling Flow through Clay Liners to Determine Required Liner Thickness. (1984) EPA/530-SW-84-001 & OSWER directive 9480.00-9D

(6) Test Methods for Evaluating Solid Wastes, third edition. (November 1986) SW-846

(7) A Method for Determining the Compatibility of Hazardous Wastes. EPA/600-02-80-076

(8) Guidance Manual on Hazardous Waste Compatibility

EXHIBIT 1-10
(Continued)

OTHER FEDERAL AND STATE CRITERIA, ADVISORIES, AND GUIDANCE TO BE CONSIDERED

3. USEPA Office of Water Guidance Documents

a. Pretreatment Guidance Documents:

(1) 304(g) Guidance Document Revised Pretreatment Guidelines (3 Volumes)

(2) Guidance for POTW Pretreatment Program Manual (October, 1983)

(3) Developing Requirements for Direct and Indirect Discharges of CERCLA Wastewater, Draft. (1987)

(4) Domestic Sewage Exemption Study

(5) Guidance for Implementing RCRA Permit by Rule Requirements at POTWs

(6) Application of Correction Action Requirements at Publicly Owned Treatment Works

(7) Draft Guidance Manual on the Development and Implementation of Local Discharge Limitations Under the Pretreatment Program (1987)

b. Water Quality Guidance Documents

(1) Ecological Evaluation of Proposed Discharge of Dredged Material into Ocean Waters (1977)

(2) Technical Support Manual: Waterbody Surveys and Assessments for Conducting Use Attainability Analyses (1983)

(3) Water-Related Environmental Fate of 129 Priority Pollutants (1979)

(4) Water Quality Standards Handbook (December, 1983)

(5) Technical Support Document for Water Quality-based Toxics Control. (1983)

c. NPDES Guidance Documents

(1) NPDES Best Management Practices Guidances Manual (June 1981).

(2) Case studies on toxicity reduction evaluation (May 1983).

d. Ground Water/UIC Guidance Documents

(1) Designation of a USDW (No. 7.1, October 1979)

(2) Elements of aquifer identification (No. 7.2, October 1979)

(3) Interim Guidance Concerning Corrective Action for Primary and Continuous Release of Class I and IV Hazardous Waste wells (No. 45, April 1986). requirements

(4) Requirements applicable to wells injected into, through, or above an aquifer that has been exempted pursuant to Section 146.104(b)(4). (No. 27, July 1981)

* * * AUGUST 8, 1988 DRAFT * * *

EXHIBIT 1-10
(Continued)

OTHER FEDERAL AND STATE CRITERIA, ADVISORIES, AND GUIDANCE TO BE CONSIDERED

(5) Guidance for UIC implementation on Indian lands. (No. 33, October 1983)

e. Ground-Water Protection Strategy (August 1984).

f. Clean Water Act Guidance Documents (See Exhibit 3-1).

4. USEPA Manuals from the Office of Research and Development

- SW 846 methods - laboratory analytic methods (November 1986)
- Lab protocols developed pursuant to Clean Water Act Section 304(h).

5. Nonpromulgated State Advisories

- State approval of water supply system additions or developments.
- State ground water withdrawal approvals.

Note: Many other State advisories could be pertinent. Forthcoming guidance will include a more comprehensive list.

* * * AUGUST 8, 1988 DRAFT * * *

CHAPTER 2

GUIDANCE FOR CERCLA COMPLIANCE WITH RCRA

2.0 INTRODUCTION

This chapter addresses compliance of CERCLA remedial actions with applicable or relevant and appropriate requirements in RCRA (42 U.S.C. 6901), as amended by HSWA, and regulations promulgated under that statute.[1] RCRA currently has nine discrete sections (Subtitles) that deal with specific waste management activities. Three of these Subtitles are most likely to be the basis for applicable or relevant and appropriate requirements for CERCLA remedial actions: Subtitle C (Hazardous Waste Management), Subtitle D (Solid Waste Management), and Subtitle I (Underground Storage Tank Regulation). Of these, the provisions in Subtitle C, which mandate the creation of a "cradle to grave" management system for hazardous waste by regulating the generation, transportation, treatment, storage, and disposal of hazardous waste,[2] have the greatest likelihood of being applicable or relevant and appropriate to CERCLA actions, because they address situations similar to CERCLA site conditions or activities. This chapter therefore mainly addresses Subtitle C, but also references Subtitles D and I where appropriate.

Many of the potential ARARs have been listed in Exhibits 1-1 (Chemical-Specific Requirements), 1-2 (Location-Specific Requirements) and 1-3 (Action-Specific Requirements) in Chapter 1, Section 1.2.3. Therefore, this chapter concentrates on issues that can arise in determining whether RCRA requirements are applicable or relevant and appropriate in particular site-specific circumstances.

This chapter is organized as follows:

Section 2.1 highlights the importance of coordination between CERCLA and RCRA offices.

Section 2.2 provides a description of the basic structure and purposes of RCRA.

Section 2.3 addresses the jurisdictional requirements for RCRA applicability.

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[1] This manual currently addresses RCRA requirements for CERCLA actions only where hazardous wastes will remain on site. Off-site remedial actions will be addressed at a later date.

[2] Waste is defined by the regulations to be hazardous (unless specifically excluded) if it meets one of three criteria: (1) it has a characteristic of hazardous waste (ignitability, corrosivity, reactivity, or toxicity); (2) it is listed as a hazardous waste; or (3) it is a mixture that contains a hazardous waste.

Section 2.4 discusses which RCRA requirements (i.e., requirements established by the Federal program, State programs, and requirements under the Hazardous and Solid Waste Amendments of 1984 (HSWA)) should be consulted in particular circumstances.

Section 2.5 addresses issues involved in RCRA storage requirements.

Section 2.6 addresses issues involved in RCRA treatment requirements.

Section 2.7 addresses issues involved in RCRA disposal requirements.

2.1 COORDINATION BETWEEN CERCLA (SUPERFUND) AND RCRA OFFICES

This chapter is written to provide an overview of key RCRA requirements that may be applicable or relevant and appropriate to CERCLA remedial actions. However, since RCRA statutory and regulatory requirements are complex and many RCRA regulations are still under development, it is important that the lead agency consult with Regional and State RCRA experts[3] for assistance in identifying RCRA ARARs. Each Region should develop procedures, protocols, or memoranda of understanding that, while not recreating the administrative aspects of a permit, ensure such early and continuous coordination. Such procedures may also include a mechanism for keeping the appropriate State or Federal RCRA program informed of how RCRA ARARs are met during the remedial construction phase. (See also Chapter 1, Section 1.2.1).

In addition, since Superfund program policy on RCRA ARARs will continue to be developed as new RCRA regulations are promulgated, it may also be important to consult with the appropriate Headquarters Superfund office on questions regarding potential RCRA ARARs.

2.2 OVERVIEW OF RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)

The Resource Conservation and Recovery Act (RCRA) was passed in 1976[4] to meet three goals: the protection of human health and the environment, the reduction of waste and the conservation of energy and natural resources, and the reduction or elimination of the generation of hazardous waste as expeditiously as possible. The Hazardous and Solid Waste Amendments (HSWA) of 1984 significantly expanded the scope of RCRA by adding new corrective action requirements, land disposal restrictions, and technical requirements.

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[3] Consultation with State RCRA experts is particularly important where States are authorized to administer and enforce RCRA (see section 2.4).

[4] RCRA (Pub. L. No. 94-580, 90 Stat. 2795) was passed in 1976 as a series of amendments to the Solid Waste Disposal Act of 1965 (Pub. L. No. 89-272). The amendments were so extensive that the statute is commonly referred to as RCRA.

The RCRA regulations implementing Subtitle C establishing the hazardous waste management system first became effective on November 19, 1980. (The regulations were published on May 19, 1980, (45 FR 33066) and became effective six months later.) Additional standards pertaining to the management of hazardous wastes at permitted treatment, storage, and disposal facilities have been issued periodically since. Included among these are the land disposal restrictions under Subpart F (see p. 2-21 for effective dates) and tank system regulations (see p. 1-48, p. 2-12, and p. A-6), which became effective January 12, 1987.

The regulations comprising the management system are of two types: general standards that govern such topics as ground-water protection, closure, and post-closure care requirements for facilities (40 CFR Part 264 Subparts B through G), and specific standards that regulate the installation, operation, inspection, and closure of containers, tanks, surface impoundments, waste piles, land treatment units, landfills, incinerators, and the processes of thermal treatment, chemical or biological treatment, and underground injection (40 CFR Part 264 Subparts I through O and X, and 40 CFR 265 Subparts P, Q, and R).

For CERCLA actions which involve treatment, storage, or disposal of RCRA hazardous waste after July 26, 1982, the 40 CFR Part 264 standards promulgated on that date will generally be applicable. (Note further discussion of Part 264 Subpart F requirements in Section 2.7.4.1 below). If RCRA hazardous waste was treated, stored, or disposed at the site before the effective date of these Part 264 standards, the Part 264 standards would not be applicable if the CERCLA action does not involve current treatment, storage, or disposal, but may be relevant and appropriate.

While EPA has promulgated regulations in many areas since RCRA was first passed, the Hazardous and Solid Waste Amendments of 1984 (HSWA) will result in promulgation of additional requirements pertaining to several topics. Final promulgation of regulations to implement HSWA are expected in the future in the following areas that may affect CERCLA cleanup actions:

- Standards for underground storage tanks containing petroleum or hazardous chemicals (proposed 52 FR 12662, April 17, 1987);

- New procedures for determining if a waste is a hazardous waste (forthcoming);

- Technical standards for liners and leak detection systems in new landfills, surface impoundments, waste piles, underground tanks, and land treatment units (proposed 52 FR 20218, May 29, 1987);

- Regulations for the monitoring and control of air emissions for volatile organics control at land disposal facilities (proposed 52 FR 3748, February 5, 1987);

- Requirements concerning land disposal restrictions on hazardous wastes (promulgated in part on November 7, 1986 and July 8, 1987 and

forthcoming according to the schedule listed on p. 2-21). Land disposal of contaminated soil or debris resulting from a response action under CERCLA §104 or §106 is currently exempt from these requirements. This statutory exemption period will end on November 8, 1988.

- Regulations under Subtitle D affecting solid waste disposal facilities (forthcoming).

- Regulations specifying procedures for carrying out corrective actions at RCRA facilities (forthcoming).

- Requirements concerning restrictions of hazardous wastes in underground injection wells (forthcoming).

These regulations, when promulgated, are likely to be ARARs in certain circumstances. As these and other regulations are promulgated, this manual will be updated as necessary.

2.3 JURISDICTIONAL REQUIREMENTS FOR SUBTITLE C APPLICABILITY

RCRA Subtitle C regulates the treatment, storage, and disposal of hazardous waste. In determining the jurisdictional requirements of regulations promulgated under Subtitle C, the definitions of solid waste and hazardous waste, the types of activities covered, and the time periods covered should be analyzed.

In general, RCRA Subtitle C requirements for the treatment, storage, or disposal of hazardous waste will be applicable if a combination of the following conditions are met:

(1) the waste is a listed[5] or characteristic[6] waste under RCRA; <u>and</u>

(2)(a) the waste was treated, stored, or disposed (as defined in 40 CFR §260.10) after the effective date of the RCRA requirements under consideration; <u>or</u>

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[5] Listed hazardous wastes under RCRA are found in 40 CFR Part 261, Subpart D. The Subpart D lists identify waste streams from specified sources or industrial processes and certain discarded commercial chemical products as hazardous. Some RCRA requirements apply to hazardous wastes as defined in RCRA §1004(5).

[6] Characteristic hazardous wastes under RCRA are described in 40 CFR Part 261, Subpart C. Testing methods and protocols for characteristic determinations (ignitability, corrosivity, reactivity, and Extraction Procedure toxicity) are contained in <u>Test Methods for Evaluating Solid Waste</u>, 3rd edition, Volume 1C, Laboratory Manual (SW-846).

(b) the activity at the CERCLA site constitutes treatment, storage, or disposal as defined by RCRA.

Thus, there are two scenarios under which RCRA requirements may be applicable to CERCLA sites. First, if the lead agency determines that RCRA listed or characteristic hazardous waste is present and the wastes were treated, stored, or disposed at the site after the effective date of the RCRA Subtitle C requirements under consideration, then the pertinent RCRA Subtitle C requirements will be applicable to the waste activity. Generally, traditional RCRA regulated facilities that have been listed on the NPL may fall into this category, even if the proposed CERCLA action would not involve treatment, storage, or disposal. For example, if a RCRA Subtitle C landfill operated at the site after the effective date of the RCRA closure requirements, then the lead agency would need to comply with the applicable closure requirements for those units in completing the remedial action.

Under the second scenario, the CERCLA activity involves treatment, storage, or disposal of hazardous waste. If the lead agency determines that RCRA listed or characteristic hazardous waste is present at the site (even if the waste was disposed before the effective date of the requirement) and the proposed CERCLA action involves treatment, storage, or disposal as defined under RCRA Subtitle C, then RCRA requirements related to those actions would be applicable.

These two scenarios are contingent upon determinations that a RCRA Subtitle C hazardous waste is present and on the identification of the period of waste management. To determine whether a waste is a listed waste under RCRA, it is often necessary to know the source. However, at many Superfund sites no information exists on the source of the wastes. The lead agency should use available site information, manifests, storage records, and vouchers in an effort to ascertain the nature of these contaminants. When this documentation is not available, the lead agency may assume that the wastes are not listed RCRA hazardous wastes, unless further analysis or information becomes available which allows the lead agency to determine that the wastes are listed RCRA hazardous wastes. If the lead agency is unable to make an affirmative determination that the wastes are RCRA hazardous wastes, RCRA requirements would not be applicable to CERCLA actions, but may be relevant and appropriate if the CERCLA action involves treatment, storage or disposal and if the wastes are similar or identical to RCRA hazardous waste.

Under certain circumstances, although no historical information exists about the waste, it may be possible to identify the wastes as RCRA characteristic wastes. This is important in the event that (1) remedial alternatives under consideration at the site involve on-site treatment, storage, or disposal, in which case RCRA may be triggered as discussed in this chapter; or (2) a remedial alternative involves off-site shipment. Since the generator (in this case, the agency or responsible party conducting the Superfund action) is responsible for determining if the wastes exhibit any of these characteristics (defined in 40 CFR §261.21-24), testing may be required. The lead agency must use best professional judgment to determine, on a site-specific basis, if testing for hazardous characteristics is necessary.

In determining whether to test for the toxicity characteristic using the Extraction Procedure (EP) Toxicity Test[7], it may be possible to assume that certain low concentrations of waste are not toxic. For example, if the total waste concentration is 20 times or less the EP Toxicity concentration, the waste cannot be characteristic hazardous waste. In such a case RCRA requirements would not be applicable. In other instances, where it appears that the substances may be characteristic hazardous waste (ignitable, corrosive, reactive, or EP toxic), testing should be performed.

If the wastes exhibit hazardous characteristics, RCRA requirements are potentially applicable if the wastes also were either treated, stored, or disposed after the effective date of the applicable RCRA requirement or if the CERCLA actions will involve treatment, storage, or disposal.

If RCRA Subtitle C is not applicable, further analysis may be done to determine whether it is both relevant and appropriate.[8] This determination depends first on whether the waste at the site is "sufficiently similar" to a RCRA hazardous waste. The following paragraphs provide guidance on evaluating CERCLA waste with regard to this "sufficiently similar" test.

In addition to identifying hazardous wastes through characteristic testing, EPA analyzes wastes from specific industries or processes, and lists certain wastes or waste streams if it determines they should be regulated as a hazardous waste under RCRA. EPA's listing decision is based on an analysis of a number of factors that affect the hazard of the waste, including the toxicity of the constituents in the waste stream and their concentration, persistence, and bioaccumulation characteristics, as well as volume generated and potential for mismanagement. Simply the presence of a hazardous constituent in a waste is not sufficient to automatically consider a waste to be hazardous under RCRA.

Similarly, when evaluating whether Subtitle C requirements are relevant and appropriate, the mere presence of hazardous constituents in a CERCLA waste does not mean the waste is sufficiently similar to a RCRA hazardous waste to trigger Subtitle C as an ARAR. Judgment should be used in assessing whether the waste closely resembles a RCRA hazardous waste, considering the chemical composition, form, concentration, and any other information pertinent to the nature of the waste. For example, waste in barrels that is virtually identical to a listed waste might be sufficiently similar. By contrast, low

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[7] Currently, 14 contaminants are listed for the characteristic of EP toxicity. A waste exhibits the characteristic of EP toxicity if an extract of a representative sample of the waste, tested using the specified procedures, contains any of these 14 contaminants equal to or greater than the concentration level specified in 40 CFR §261.24.

[8] See Chapter 1, section 1.2.2, p. 1-10, and section 1.2.4.3, p. 1-65 to p.1-70, for detailed guidance on making the determination that a requirement is both relevant and appropriate.

concentrations of a hazardous constituent, dispersed in soil over a wide area, would generally not trigger Subtitle C as relevant and appropriate. (For determination of relevance and appropriateness see general discussion on page 1-65.)

2.3.1 DEFINITION OF HAZARDOUS WASTE

Generally, most requirements under RCRA are triggered by the management of waste defined specifically as solid or hazardous[9] (See generally 40 CFR Part 261). Solid waste is defined very broadly under the regulations to include garbage (i.e. from households), refuse (metal scrap and other commercial wastes), sludges from facilities such as wastewater treatment plants and pollution control facilities, and other discarded materials in solid, semi-solid, liquid, or contaminated gaseous forms resulting from industrial, commercial, mining, agricultural, and community activities. Hazardous waste is considered a subset of solid waste, and is subject to regulation under RCRA if:

(1) the wastes exhibit one of four characteristics (ignitability, corrosivity, reactivity, or EP toxicity);

(2) are waste streams or discarded chemical products listed in the RCRA regulations as hazardous wastes (40 CFR Part 264 Subpart D); or

(3) are mixtures of solid waste and waste listed as hazardous by RCRA regulations.

Wastes that are specifically excluded from regulation as a hazardous waste include household wastes, municipal resource recovery wastes, and some wastes returned to the land as fertilizer.

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[9] Most provisions in Subtitle C of RCRA apply to hazardous waste listed or identified as characteristic pursuant to §3001, as described above in (1) through (3). However, RCRA §§3004(b), (c), and (u) apply to the broader definition of hazardous waste found in RCRA §1004(5): "The term 'hazardous waste' means a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed." RCRA §3004(b) prohibits placement of noncontainerized or bulk liquid "hazardous waste" (as defined in §1004(5)) in certain salt domes and other geologic formations. Similarly, noncontainerized or bulk liquid hazardous waste may not be placed in any landfill (§3004(c)). Section 3004(u) pertains to corrective action for solid waste management units at RCRA facilities.

2.3.2 TREATMENT, STORAGE, AND DISPOSAL OF HAZARDOUS WASTE

Management of hazardous waste is divided by the statute and the regulations into treatment, storage, and disposal. EPA has determined that the following jurisdictional prerequisites will trigger the applicability of some portion of the RCRA 40 CFR Part 264 requirements for a CERCLA remedial action:

(1) RCRA storage requirements apply to the storage of RCRA hazardous waste after November 19, 1980.[10] Waste received by a facility before November 19, 1980, is still subject to RCRA requirements if the waste is stored after that date. Generators storing wastes for less than 90 days are not required to seek permits, but must satisfy the standards in 40 CFR Part 265 Subpart I for containers or the standards in 40 CFR Part 265 Subpart J for tanks.[11]

(2) RCRA requirements for treatment or disposal[12] of hazardous wastes apply if:

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[10] "Storage" means the holding of hazardous waste for a temporary period, at the end of which the hazardous waste is treated, disposed of, or stored elsewhere. (40 CFR §260.10(a)) Secondary containment system regulations for tank systems were enacted July 14, 1986, and must be met by January 12, 1989 for tanks containing dioxins, and for other tanks, by January 12, 1991, or when the system has reached 15 years of age, whichever comes later.

[11] Generators of hazardous waste may accumulate hazardous waste on-site for less than 90 days without a permit or interim status, provided that: (1) the waste is placed in containers or tanks that are in compliance with Subparts I and J of 40 CFR Part 265 (excluding §265.197(c) and §265.200); (2) the containers and tanks are clearly dated and marked "hazardous waste;" and (3) the generator complies with Subparts C and D of 40 CFR Part 265 and with §265.16 (See 40 CFR §262.34(a)). In addition, generators of less than 100 kg/month of hazardous waste are not subject to the 90-day limit (40 CFR §261.5); and generators of less than 1000 kg/month of hazardous waste may accumulate waste for up to 180 days without a permit (40 CFR 262.34(d)).

[12] "Treatment" means any method, technique, or process, including neutralization, designed to change the physical, chemical, or biological character or composition of any hazardous waste so as to neutralize such waste, or so as to recover energy or material resources from the waste, or so as to render such waste non-hazardous or less hazardous; safer to transport, store, or dispose of; or amenable for recovery, amenable for storage, or reduced in volume. (40 CFR §260.10)

"Land disposal" is defined by Section 3004(k) of RCRA as follows: "when used with respect to a specified hazardous waste, shall be deemed to include, but not be limited to, any placement of such hazardous waste in a landfill, surface impoundment, waste pile, injection well, land treatment facility, salt dome formation, salt bed formation, or underground mine or cave."

a) the unit or area of contamination[13] contains RCRA hazardous waste that was treated or disposed of after the effective date of the pertinent requirements;[14] or

b) the CERCLA activity at the unit or area of contamination constitutes treatment or disposal of RCRA hazardous waste, as defined under RCRA.[15]

(3) RCRA corrective action requirements[16] apply at sites that are subject to RCRA regulation under paragraphs 1 and 2 above, and to all releases of hazardous waste or constituents from "solid waste management units" existing at facilities containing such units. Solid waste management units include "any unit from which hazardous constituents might migrate, irrespective of whether the units were intended for the management of solid and/or hazardous wastes." Certain corrective action requirements specified under HSWA were codified in 50 FR 28712, July 15, 1985, and 52 FR 45788, December 1, 1987.

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[13] Disposal of RCRA hazardous waste into a unit or area of contamination (AOC) will trigger applicability of certain RCRA requirements to the unit or AOC. See section 2.7 for more detailed discussion.

[14] For example, the requirements for groundwater monitoring are applicable to surface impoundments, landfills, land treatment units, and waste piles that received hazardous waste after July 26, 1982.

[15] When current activity at the CERCLA site constitutes treatment or disposal, the activity must also meet the conditions described in Sections 2.6 or 2.7 of this chapter.

[16] "Hazardous waste" requiring corrective action under §3004(h) is defined more broadly than wastes listed or identified under §3001. Corrective action applies to hazardous waste as defined in §1004(5). See Footnote 9.

A portion of the RCRA requirements under 40 CFR Part 264 will likely be applicable at most CERCLA sites that contain RCRA hazardous waste because remedial actions at those sites will generally constitute treatment, storage, or disposal after the effective date of RCRA. In those cases in which a RCRA facility has been listed on the NPL, the applicability of RCRA standards to the facility has already been determined. In addition to the jurisdictional prerequisites listed above, however, RCRA treatment, storage, and disposal standards each have their own separate requirements. Therefore it will be necessary to utilize the procedures outlined in Chapter 1 and take into account issues addressed in this chapter in order to determine which RCRA requirements are applicable or relevant and appropriate to particular CERCLA activities.

2.3.3 ADDITIONAL CONSIDERATIONS IN DETERMINING SUBTITLE C ARARs

The following general principles may assist in determining potentially applicable or relevant and appropriate RCRA requirements[17]:

- RCRA permits are not required for CERCLA actions taken entirely on-site. Facilities used for off-site disposal are required by CERCLA §121(d)(3) to be in compliance with all pertinent RCRA requirements (e.g., have a RCRA permit or interim status and have any releases from SWMUs being controlled by corrective action).

- Administrative RCRA requirements, such as reporting and recordkeeping requirements, are not applicable or relevant and appropriate for on-site activities.

- RCRA requirements that are not applicable may nonetheless be relevant and appropriate based on site-specific circumstances. In some cases, the source or prior use of a CERCLA waste may not be identifiable, but the waste may be identical in composition to a listed RCRA waste derived from a known source or use, and therefore RCRA requirements would be relevant. In addition, a determination must be made whether the requirement is appropriate given the circumstances of the release, the site characteristics, and the remedial activity. Only those requirements that are determined to be both relevant and appropriate must be complied with. (See Chapter 1, pp. 1-10 and 1-65 to 1-70 for a detailed discussion of the determination that a requirement is relevant and appropriate).

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[17] RCRA guidance, although not ARAR, may also be considered and includes: Permit Writers' Guidance Manual for the Location of Hazardous Waste Land Storage and Disposal Facilities: Phase I. Criteria for Location Acceptability and Existing Regulations for Evaluating Locations (Final Draft), February 1985; Permit Applicants Guidance Manual for the General Facility Standards of 40 CFR 264, SW-968, October 1983; and Guidance for Ground-Water Classification Under the EPA Ground-Water Protection Strategy, (Final Draft), December 1986.

RCRA regulations are organized by particular waste management processes (i.e., types of technology, such as incineration, tanks, or land treatment) as well as by general standards (i.e., types of actions, such as disposal, closure, or corrective action, that may pertain to several different processes). Potential ARARs for CERCLA sites may pertain to either the process or the action. Action-specific requirements generally refer to an action or to a particular type of waste management process.

2.4 FEDERAL AND STATE RCRA REQUIREMENTS

Federal regulations under RCRA establish minimum national standards defining the acceptable management of hazardous waste. States can be authorized by EPA to administer and enforce RCRA hazardous waste management programs in lieu of the Federal program if the States have equivalent statutory and regulatory authority. In these authorized States, the Federal regulations promulgated pursuant to RCRA are not applicable until the State adopts the Federal regulations through its own legislative process. Federal regulations promulgated pursuant to HSWA, however, are effective immediately. The regulations in these State programs may be more stringent or have a greater scope of coverage than the Federal program. If a State is not authorized for a particular part of the RCRA program, the Federal government is responsible for that portion of the program in the State, and Federal regulations are applicable.

If the CERCLA site is located in a State with an authorized RCRA program, the State's promulgated RCRA requirements will replace the equivalent Federal requirements as potentially ARAR. If the remedial action is taking place in a State without full authorization, Federal requirements may be ARAR, unless the State's promulgated regulations satisfy the requirement in CERCLA §121 that they are "more stringent" than the Federal standard. Since a State may be authorized for only a portion of the RCRA program, both Federal and State standards may need to be evaluated. To retain final authorization, the State must adopt HSWA-related requirements as State law by specified dates. Thus, State authority and regulations will eventually replace corresponding Federal requirements when the State receives Federal authorization for HSWA. These requirements would then be analyzed as potential ARARs.[18]

Because the timetable for implementation of HSWA requirements extends into the 1990's, consideration of both Federal and State potential ARARs will be necessary for some time to come. The forthcoming HSWA standards that may affect CERCLA cleanup actions in the future are listed on page 2-3.

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[18] Currently, the Agency is developing additional guidance on State ARARS, to be incorporated in this manual at a later date.

2.5 RCRA STORAGE REQUIREMENTS

Remedial action at a CERCLA site may require short- or long-term storage of hazardous substances found at the site.[19] Whether RCRA storage requirements will be applicable will depend on whether the waste is a RCRA hazardous waste, and on whether the waste has been or will be stored after November 19, 1980. If these requirements are not applicable, whether they are relevant and appropriate should be determined based on the procedure for determining relevance and appropriateness outlined in Chapter 1.

The jurisdictional prerequisites for applicability of the RCRA storage requirements are:

(1) The substance to be stored must be a RCRA hazardous waste. (If the substance meets the definition of ignitable or reactive wastes, incompatible wastes, or special categories of wastes, special requirements under the RCRA container storage, tank storage, surface impoundment storage, and waste pile storage regulations pertaining to these wastes might also be applicable); and

(2) The hazardous waste must be stored after November 19, 1980. Note that waste received by a facility before that date is still subject to RCRA requirements if stored in tanks or containers after that date. Thus, if the CERCLA site contains an existing storage area holding RCRA hazardous waste, the requirements are applicable.[20] Alternatively, if the RCRA hazardous waste first becomes subject to regulation as a result of the actions taken at the cleanup site, RCRA storage requirements will be applicable. In these situations, depending on the amounts and types of wastes being stored, different requirements may become applicable.[21]

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[19] RCRA requirements for the use of storage containers are given in 40 CFR Part 264 Subpart I, those regarding storage tanks are in 40 CFR Part 264 Subpart J, those regarding storage surface impoundments are in 40 CFR Part 264 Subpart K, and those regarding storage piles are in 40 CFR Part 264 Subpart L. EPA has recently issued a notice of proposed rulemaking that would require leak detection systems for tanks, surface impoundments, and storage piles. (May 29, 1987, 52 FR 20218).

[20] The land disposal restrictions rule also provides that any waste that is prohibited from one or more methods of land disposal also is prohibited from storage unless the storage is solely to accumulate sufficient quantities of the waste to allow for proper recovery, treatment, or disposal.

[21] There are several types of small quantity generators and different provisions (40 CFR §262.34) apply depending on length of storage and amount of hazardous waste generated. For example, a generator accumulating less than 55 gallons of hazardous waste or one quart of an acutely hazardous waste listed in §261.33(3) in containers at or near any point of generation where wastes initially accumulate are not subject to the 90 day limit, as long as

Finally, when it is determined that a waste is a RCRA hazardous waste, and that the waste will be stored, a decision must be made as to whether the RCRA requirements pertaining to storage are applicable. The particular storage requirements applicable will depend upon the type of container used. Determining which storage requirements under RCRA are applicable will require analysis of the prerequisites included in Subparts I, J, K, or L for the different types of storage. Subpart I requires determining whether the receptacle satisfies the definition of "container" in 40 CFR §260.10. Subpart J requires a determination if the receptacle is a "tank," as tanks are defined by the regulations (40 CFR §260.10). Technical requirements under HSWA for underground tanks are being developed, and in the future they will also have to be considered in the ARAR analysis.[22] Subpart L requires a determination whether the waste is being stored in a "pile," as defined in the regulations. However, certain covered waste piles are exempt from a part of the waste pile requirements. A decision on the applicability of the waste pile regulations will require an analysis of both basic definitions and exemptions.

Even if they are not applicable, portions of RCRA requirements for tanks (40 CFR Part 264, Subpart J) may be relevant and appropriate for sites where temporary storage in tanks is required. For example, the requirement that tanks have sufficient minimum shell thickness and pressure controls to prevent collapse or rupture may be relevant and appropriate, since the purpose of this requirement is to ensure that the tank does not create additional environmental problems due to its own failure. Subpart J further requires that tanks have an inner lining or coating, or an alternative means of protection such as cathodic protection or corrosion inhibitors, in order to ensure that the tank is safe throughout its effective life. This requirement, while relevant, might not be appropriate unless the tanks were expected to be in use for several years. For example, if hazardous substances will be stored temporarily in the tanks and then drained, with the process repeated many times, then such protection requirements would be both relevant and appropriate.

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§§265.171, 265.172 and 265.173(a) are being complied with and containers are marked clearly as hazardous waste. These sections require that the waste is being stored in containers that are in good condition, are compatible with the waste being stored, and are handled properly to prevent rupture or leaking. (40 CFR §262.34(c)(1)). Generators of between 100 kg. and 1000 kg. of hazardous waste per month may accumulate it for up to 180 to 220 days (if they comply with tank and/or container regulations for storage) without requiring a permit or interim status.

[22] Technical standards for underground storage tanks containing petroleum or hazardous substances were proposed on April 17, 1987, 52 FR 12662.

2.6 RCRA TREATMENT REQUIREMENTS[23]

SARA §121 establishes a preference for remedial actions involving treatment that permanently and significantly reduces the volume, toxicity, or mobility of the hazardous substances, pollutants, and contaminants at the site. Whether RCRA requirements pertaining to treatment will be applicable for a CERCLA activity will depend on whether the prerequisites for RCRA applicability are satisfied.

RCRA requirements for treatment of hazardous wastes apply at a CERCLA site only if: (a) the waste is a RCRA listed or characteristic waste; and (b) the CERCLA activity constitutes treatment of RCRA hazardous waste, as defined under RCRA. The general RCRA definition of treatment is:

> any method, technique, or process, including neutralization, designed to change the physical, chemical, or biological character or composition of any hazardous waste so as to neutralize such waste, or so as to recover energy or material resources from the waste, or so as to render such waste non-hazardous, or less hazardous; safer to transport, store, or dispose of; or amenable for recovery, amenable for storage, or reduced in volume. (40 CFR §260.10)

When it is determined that these conditions are met, it is necessary to analyze the prerequisites included in the particular subpart that pertains to the type of treatment being considered, in order to determine which treatment requirements are applicable.[24] Those prerequisites are described in detail in Exhibit 1-3 (Action-Specific Requirements) in the preceding chapter.

Finally, the RCRA treatment requirements also contain special standards for ignitable or reactive waste, incompatible waste, and special categories of wastes. If the requirements pertaining to treatment are otherwise applicable, and if the wastes to be treated at the CERCLA site fall into any of the above special waste categories, the special treatment standards for such wastes will be applicable.

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[23] See Section 2.7.3, Special Restrictions Applicable to Land Disposal, for discussion of best demonstrated available treatment technologies (BDAT).

[24] RCRA treatment requirements are found in 40 CFR Part 264 Subpart J (Tanks), Subpart K (Surface Impoundments), Subpart L (Waste Piles), Subpart M (Land Treatment), Subpart O (Incinerators); 40 CFR Part 265 Subpart P (Thermal Treatment) and Subpart Q (Chemical, Physical, and Biological Treatment); in proposed standards for 40 CFR Part 264 Subpart X (Miscellaneous Treatment Units); and in 40 CFR Part 268 (Land Disposal Restrictions). These requirements include design and operating standards.

2.7 RCRA REQUIREMENTS TRIGGERED BY DISPOSAL

Remedial actions at a CERCLA site can frequently involve grading, excavating, dredging, or other measures that move contaminated materials from one place to another or in other ways disturb them. Such actions may constitute disposal of hazardous waste.

Definition of Land Disposal

EPA has concluded that moving RCRA hazardous waste (including hazardous waste that was originally disposed before the 1980 RCRA effective date) constitutes disposal when RCRA hazardous waste is moved from one unit and placed in another unit. It should be noted that disposal and placement are synonymous for purposes of the land disposal restrictions under RCRA. Therefore, land disposal is the same as placement into a land disposal unit and will be treated as the same action throughout the remainder of the chapter.

In many cases, an area of contamination at a CERCLA site with differing concentration levels of hazardous substances, pollutants, or contaminants can be viewed as a single large "unit," e.g., a single landfill. In such cases, when RCRA hazardous waste is moved from one part of the unit to another, disposal/placement has not occurred. For example, an area of generally dispersed waste containing an existing or new landfill unit could be viewed as a single large landfill. Consolidation of waste from throughout the area into the smaller "landfill" would not constitute disposal/placement under this scenario, because the waste can be viewed as being part of the same overall land-based unit.

However, movement of hazardous waste into the area of contamination would make RCRA requirements triggered by disposal/placement applicable to the waste being managed and certain RCRA requirements (such as for closure) are applicable to the entire area of contamination where the waste is received. In addition, placement in a newly created or existing surface impoundment, or placement in a tank or incinerator and replacement on land, even within the larger area of contamination, would trigger applicability of RCRA requirements for disposal/placement, because the waste is being moved to different types of units.

HSWA defines land disposal as the following:

> [T]he term "land disposal", when used with respect to a specified hazardous waste, shall be deemed to include, but not be limited to, any placement of such hazardous waste in a landfill, surface impoundment, waste pile, injection well, land treatment facility, salt dome formation, salt bed formation, or underground mine or cave. (RCRA §3004(k); HSWA §201(k))

RCRA requirements for disposal/placement of hazardous wastes in a landfill, waste pile, underground injection well, surface impoundment, or land

farm apply if (a) RCRA hazardous waste[25] was placed/disposed into a land disposal unit after November 19, 1980 (or after the effective date of the appropriate land disposal regulations); or, (b) if actions at the CERCLA site constitute disposal as defined above. Exhibit 2-1 presents an illustration of selected actions that constitute disposal. General types of actions that do or do not constitute disposal/placement are summarized below. Actions which are not disposal/placement will not trigger the applicability of RCRA disposal requirements, such as landfill closure, minimum technology, or land disposal restrictions, but these requirements may be relevant and appropriate.

EPA has determined that placement/disposal occurs when:

- Wastes from different units are consolidated into one unit (other than a land disposal unit within an area of contamination);
- Waste is removed and treated outside a unit and redeposited into the same or another unit (other than a land disposal unit within an area of contamination);
- Waste is picked up from the unit and treated within the area of contamination in an incinerator, surface impoundment, or tank and then redeposited into the unit. (Does not include in-situ treatment.)

Placement/disposal does not occur under the following circumstances:

- Waste is consolidated within a unit (including an area of contamination that can be viewed as a single unit, see p. 2-15);
- Waste is capped in place, including grading prior to capping;
- Waste is treated in situ;
- RCRA hazardous waste is processed within the unit in order to improve its structural stability for closure or for movement of equipment over the area. Under this scenario, the wastes are processed in order to stabilize the wastes prior to capping or for the purpose of moving machinery across the area. Wastes are not considered to be undergoing treatment in these situations.

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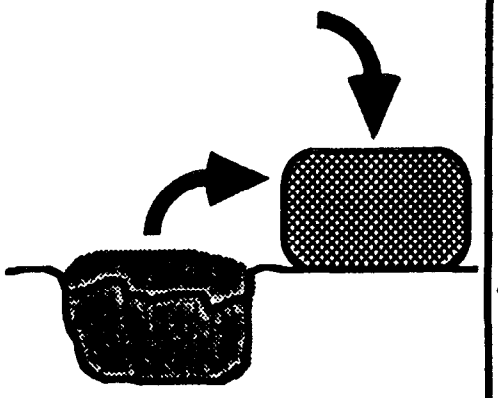
[25] Disposal for purposes of §3004(b), (c), and (u) is not limited to characteristic waste -- it encompasses the statutory definition of hazardous waste in §1004(5) of RCRA. See Footnote 9.

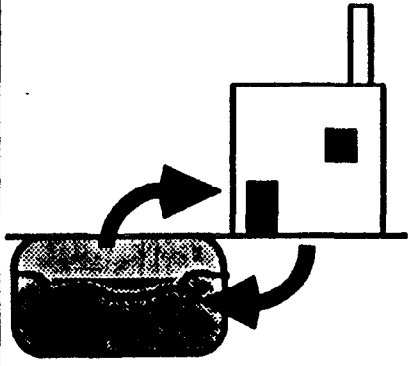
EXHIBIT 2-1

WHAT IS DISPOSAL/PLACEMENT



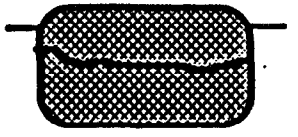
CONSOLIDATE OUTSIDE OF AREA OF CONTAMINATION

YES



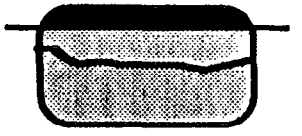
TREAT AND REPLACE

YES



CONSOLIDATE IN SAME AREA

NO



CAP

NO

If disposal of RCRA hazardous waste will occur as part of a CERCLA remedial action or has already occurred, several RCRA requirements may be applicable to that action.[26] Depending on the precise action to be undertaken, these requirements may include the following:

- Design and operating requirements in 40 CFR Part 264 for RCRA-regulated processes that constitute disposal;
- Closure requirements in 40 CFR Part 264; and
- Special RCRA requirements in 40 CFR Part 268 pertaining to the land disposal of particular hazardous wastes.

Each of these categories of requirements and the actions that trigger them are described in greater detail in this section.

2.7.1 DESIGN AND OPERATING REQUIREMENTS TRIGGERED BY DISPOSAL

The RCRA regulations recognize that disposal of hazardous waste may take place in landfills, land treatment units, surface impoundments, waste piles, and by means of underground injection. The potentially applicable RCRA regulations include design requirements for landfills, waste piles, surface impoundments, and land treatment units.

HSWA established new minimum technology requirements for such land disposal units. If new landfills or surface impoundments are constructed, or if replacements or lateral expansions[27] of existing landfills or surface impoundments are used, they must satisfy these minimum technical requirements[28] (two or more liners and a leachate collection system between

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[26] In addition to RCRA disposal requirements, particular RCRA storage and treatment requirements also may be ARARs, depending on the action to be taken. See the discussion of these requirements in sections 2.5 and 2.6.

[27] "Lateral expansion" is defined to be an expansion of the boundaries of an existing unit. "Replacement" occurs if a unit is emptied and reused. Reuse occurs if original waste is removed from a unit and <u>different</u> waste (either treated or untreated from other units) is put into the unit. If waste is removed from a unit, treated, and put back into the same unit, replacement does not occur.

[28] RCRA §3001(o)(2) provides that if an owner/operator demonstrates to the Administrator, and if the Administrator finds that alternative design and operating practices and location characteristics will prevent the migration of a hazardous constituent into ground or surface water as effectively as minimum technology requirements, an exemption to the requirements shall be granted. 40 CFR Part 264.301(b) specifies that the Administrator will consider four factors in granting the exemption: 1) the nature of the waste; 2) hydrogeology of the site; 3) the proposed alternative;

the liners; in addition, for landfills another leachate collection system must be placed above the top liner)(RCRA 3004(o)). EPA proposed minimum technology requirements for liners and leak detection systems for new land disposal units on May 29, 1987 (52 FR 20218). As these and other additional HSWA standards become effective, new landfills, surface impoundments, waste piles, land treatment units, and underground tanks also will be required to satisfy additional leak detection requirements.[29]

Surface impoundments in existence on November 8, 1984, must be retrofitted to meet minimum design standards by November 8, 1988 (RCRA 3005(j)), if they will be in operation after that date, unless they meet certain statutory exceptions. Thus, use after November 8, 1988, of existing surface impoundments at a CERCLA remedial action site will trigger specific retrofitting requirements for surface impoundments, and construction of new units must conform to specific minimum technological requirements or obtain a waiver or exemption from them if RCRA hazardous waste will be disposed in the units.

2.7.2 CLOSURE REQUIREMENTS

Application of Closure Requirements. Excavation, consolidation, and other similar actions that move RCRA hazardous waste across the unit boundary, thereby constituting disposal under the interpretation described above in section 2.7.1, will trigger the closure requirements for the units into which the waste is being disposed. In particular, if soil cleanup is part of the remedy, movement of the soil containing RCRA hazardous waste across a unit boundary will make the closure requirements for either clean closure or closure in place (disposal or landfill closure) applicable to the unit into which the waste is placed.[30]

If RCRA hazardous wastes, deposited at a site before November 19, 1980, are not moved out, the RCRA requirements for disposal are not applicable, since the jurisdictional prerequisites for their applicability are not satisfied. However, because they are designed to address a problem similar to that being encountered at the CERCLA site, these requirements may be relevant and appropriate, taking into account site-specific circumstances. See p. 1-65

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and 4) all other factors affecting the leachate.

[29] A notice of proposed rulemaking was issued on May 29, 1987 (52 FR 20218) discussing leak detection regulations.

[30] EPA has proposed requirements for "hybrid" or alternate closure options under RCRA (52 FR 8712, March 19, 1987). Such closures would combine elements of clean closure and the closure in place alternatives. Because the rules on hybrid closures are proposed regulations, and have not been promulgated as final rules, they are not applicable. However, the hybrid closure may be used where closure is not applicable, but is relevant and appropriate. Additional RCRA corrective action technical requirements, discussed above, also may affect this issue.

for a detailed discussion of the determination that a requirement is both relevant and appropriate.

Types of Closure. RCRA regulations on clean closure (removal and decontamination) are found in 40 CFR §§264.111, 264.228, and 264.258. They require all waste residues and contaminated containment system components (e.g., liners), contaminated subsoils, and structures and equipment contaminated with waste and leachate to be removed and managed as hazardous waste or decontaminated before the site management is completed. The level of cleanup required has been interpreted to be "drinkable leachate" and "edible soils." The basic intent of this provision is to allow the site to remain without care and supervision after the clean closure has been completed.

RCRA regulations affecting disposal or landfill closure, in contrast, require the site to be capped with a final cover designed and constructed to provide long-term minimization of the migration of liquids through the capped area, and to maintain its integrity over time while functioning with minimum maintenance (40 CFR §§264.111, 264.228, 264.258, and 264.310). This type of closure, however, anticipates that post-closure care and maintenance will be carried out at the facility for at least 30 years after closure (40 CFR §264.117 (a)(1)).[31]

Even when the waste found at a CERCLA site is a RCRA hazardous waste, the situation or waste management activity at the CERCLA site may not technically match the situation addressed by the regulation, and the RCRA requirement would therefore not be applicable. (Even if the hazardous waste is not identical to a hazardous waste, but is very similar, some hybrid closure requirements may be applicable.) RCRA closure requirements may nevertheless be relevant and appropriate if other factors are sufficiently similar.

For example, if RCRA hazardous waste was disposed before 1980 in a unit like those covered under RCRA and the remedial action is designed to leave waste in place, a portion of one or more of the closure requirements may be relevant and appropriate. Depending on site circumstances and the remedy selected either clean closure, landfill closure, or hybrid closure, which combines elements of both, might be used.

Two scenarios in which a hybrid or alternate approach to closure may occur (where RCRA closure is not applicable but may be relevant and appropriate) are the following:

Scenario 1: Although residual contamination is above health-based levels (i.e., clean closure levels) contamination does not pose a direct contact threat or impact ground water. Residual leachate contaminant levels exceed health-based levels. A type of alternate closure, which may be termed "alternate-clean" closure, could be used. No covers or long-term management

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[31] Minimal capping requirements (e.g., permeability test) are found in proposed regulations, but much of the information on capping is found in guidance. These are not ARAR, but can be used as TBC, as appropriate.

would be required. However, fate and transport modeling and model verification is necessary to ensure that the ground water is usable. In this situation, a notice in the property deed may be necessary indicating the presence of hazardous substances.

Scenario 2: Removal of waste material results in residuals that potentially pose a direct contact threat but do not pose a threat to ground water. Residual leachate contamination does not exceed health-based levels. This type of alternate closure, which may be termed "alternate-landfill" closure, consists of a cover to address the direct contact threat. The cover, however, may be permeable. Limited long-term management would include site and cover maintenance and minimal ground-water monitoring. For this scenario, institutional controls, including land-use restrictions, would be necessary, based on site-specific considerations.

If, however, the waste is widely dispersed and not contained in a RCRA-type unit, use of RCRA closure may not be appropriate. For instance, RCRA covers are generally not appropriate for large municipal landfills or large mining waste sites, where the waste is generally of a low toxicity and the site encompasses an area that bears little resemblance to the discrete units regulated under RCRA Subtitle C.

2.7.3 SPECIAL RESTRICTIONS APPLICABLE TO LAND DISPOSAL

Certain activities undertaken involving specific wastes of a remedial action may be subject to the special restrictions on land disposal of hazardous wastes. These Land Disposal Restrictions (LDR), established by HSWA, may be required if placement occurs (placement into a unit is defined as identical to disposal; see p. 2-15 for the HSWA definition of land disposal). These amendments to RCRA prohibit the land disposal of certain untreated hazardous wastes or the residuals of treated hazardous waste not meeting specified standards.

The following schedule identifies the categories of waste and the date on which the particular waste category will be banned from land disposal:

WASTE	BAN EFFECTIVE DATE
Spent solvent wastes (F001, F002, F003, F004, F005)	November 8, 1986
Dioxin-containing wastes F020, F021, F022, F023, F026, F027, F028)	November 8, 1986
California list wastes	July 8, 1987
First third of all ranked and listed RCRA hazardous wastes	August 8, 1988

Second third of all ranked and listed RCRA hazardous wastes	June 8, 1989
All remaining ranked and listed RCRA hazardous waste and all RCRA characteristic hazardous wastes	May 8, 1990
Any RCRA hazardous waste listed or identified under RCRA 3001 after November 8, 1984	Within six months of listing or identification

RCRA wastes treated in accordance with treatment standards set by EPA under RCRA §3004(m) are not subject to the prohibitions and may be land disposed.[32] The restrictions on land disposal of hazardous wastes apply to RCRA hazardous waste placed after the effective prohibition date. Wastes land disposed before the effective prohibition date (and not removed) are not subject to the restrictions.

The treatment standards are to be achieved using the best demonstrated available treatment technologies (BDAT). The land disposal restrictions regulations establish treatment standards that are based on BDAT for a given waste. A BDAT treatment standard can take one of two forms:

(1) a concentration level to be achieved (i.e., a concentration-based standard), or

(2) a specified technology that must be used (i.e., a "technology-based" standard).

If the standard is concentration-based, any treatment technology that can achieve the standard may be used. If the standard is technology-based, that technology must be used, unless an exemption exists or a variance is granted. Thus, wastes must be treated according to the appropriate standard before wastes or the treatment residuals of wastes can be disposed in or on the land.

HSWA does provide certain CERCLA remedial actions with exemptions from compliance with the land disposal restrictions. Until November 8, 1988, disposal of soil and debris contaminated with solvents, dioxins, or California list wastes resulting from a response action taken under §§104 or 106 of CERCLA is not subject to the land disposal restrictions. EPA extended the exemption for these soil and debris wastes until November 8, 1990 (and until August 8, 1990 for certain first third wastes). On November 7, 1986, when the Agency promulgated the first set of land disposal restrictions, it also established additional temporary exemptions for several waste categories and provided a schedule of ban effective dates by waste types.

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[32] Section 3004(m) provides that EPA shall "...promulgate regulations specifying...levels or methods of treatment...which substantially diminish the toxicity of the waste or substantially reduce the likelihood of migration of the hazardous constituents from the waste."

In addition, HSWA authorizes EPA to grant national variances from the effective date of the land disposal restrictions based upon a lack of capacity to treat the wastes. A capacity variance has been granted for Superfund wastes containing spent solvents and dioxins that are not soil and debris waste until November 8, 1988. A capacity variance also exists for a portion of the California list wastes; for the wastes not granted a variance the testi restrictions are currently effective. Rules are currently being developed to establish BDAT levels for contaminated soil and debris. More exemptions and variances may be granted in the future, as additional regulations are promulgated for remaining wastes. See the following list of exemptions and variances.

Waste	Exemption/Variance
All solvent, dioxin, and California list soil and debris wastes from CERCLA response and RCRA corrective actions	Statutory two year exemption from effective dates until 11/8/88; exemption extended to 11/8/90 (exemption for certain first thirds granted until 8/8/90)
All RCRA-listed dioxin wastes	Regulatory two-year national variance until 11/8/88
All RCRA-listed solvent wastes from CERCLA response and RCRA corrective actions (non-soil and debris)	Regulatory two-year national variance until 11/8/88
Small quantity generator (100 Kg-1000 Kg per month) of RCRA solvent wastes	Regulatory two-year national variance until 11/8/88
Solvent-water mixtures, solvent containing sludges, or solvent-contaminated soil or solids (non-CERCLA or RCRA corrective action) containing less than 1 percent total F001-F005 solvent constituents as initially generated	Regulatory two-year variance until 11/8/88
Liquid and non-liquid hazardous wastes containing HOCs in total concentration greater than or equal to 1000 mg/l, or 1000 mg/kg, respectively (except for dilute HOC wastewaters)	Regulatory two-year national variance until 7/8/89

2.7.4 CORRECTIVE ACTION AND GROUND-WATER PROTECTION REQUIREMENTS

RCRA contains several authorities under which corrective action requirements will eventually be promulgated, and because of the similarity of corrective action under RCRA to CERCLA cleanup, these requirements are likely to be potential ARARs in many remedial action situations.

40 CFR Part 264 Subpart F establishes requirements for ground-water protection for RCRA-regulated land disposal units (waste piles, surface impoundments, land treatment areas, and landfills) that received hazardous waste after July 26, 1982. In addition, releases of hazardous wastes or constituents from solid waste management units (SWMUs) must be cleaned up in accordance with 40 CFR §264.101. The existing corrective action requirements in 40 CFR §264.101 require the owner/operator of a facility seeking a permit for the treatment, storage, or disposal of hazardous waste to institute corrective action as necessary to protect human health and the environment for all releases of hazardous waste or constituents from any solid waste management unit at the facility, regardless of the time at which waste was placed in such unit.

In addition to the regulatory requirements specified by 40 CFR Part 264 Subpart F, HSWA added authority in RCRA §3004(u) for corrective action for all releases from solid waste management units at RCRA treatment, storage, or disposal facilities of hazardous waste or hazardous constituents to air, surface waters, soil, or ground water. Detailed corrective action regulations are currently being developed; in the interim, corrective actions are being implemented on a case-by-case basis. The corrective action standards under §3004(u), when they are promulgated, may be potentially applicable to CERCLA activities conducted at a facility subject to RCRA Subtitle C regulation, or if the response action itself involves treatment, storage, or disposal of a RCRA hazardous waste and potentially relevant and appropriate for similar response actions and wastes. While corrective actions requirements are specified in a RCRA permit (40 CFR §264.101), CERCLA on-site remedial actions are not required to obtain permits; however, substantive corrective action requirements under §3004(u), when promulgated, may be potential ARARs. This manual will be updated to include further corrective action requirements when they are promulgated.

The two general types of ground-water corrective action requirements that should be analyzed are ground-water monitoring under RCRA Subpart F and ground-water protection (contaminant concentration) standards.

2.7.4.1 Ground-Water Monitoring Requirements under Subpart F

There are three general types of ground-water monitoring outlined in 40 CFR Part 264 Subpart F:[33]

- Detection monitoring (40 CFR §264.98)
- Compliance monitoring (40 CFR §264.99)
- Corrective action monitoring (40 CFR §264.100)

If the CERCLA remedial actions involve creation of a new unit to dispose of RCRA hazardous waste, the three types of monitoring contained in Subpart F would be applicable.[34] In all other cases, corrective action monitoring (40 CFR §264.100) will be applicable to remedial actions undertaken at existing RCRA units or where the disposal of RCRA hazardous waste (as defined) occurs at an existing area of contamination as part of the remedial action. Corrective action monitoring is generally triggered by remedial action involving management of RCRA wastes. Such monitoring may be required for three years following completion of the remedy to ensure that the clean-up level is not exceeded.[35]

2.7.4.2 Ground-Water Protection Standards under Subpart F

Evaluation of the RCRA ground-water protection standards under Subpart F as ARARs should be done in the context of the Superfund approach for establishing and meeting ground-water protection goals. The Superfund approach derives its ground-water restoration goals primarily from the vulnerability, use, and value of the contaminated ground water. The goals of the Superfund program's approach are to return ground waters to their beneficial uses (e.g., restore current or potential sources of drinking water to drinking water quality) within time frames established as appropriate for

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[33] These requirements are described in detail in RCRA Ground-Water Monitoring Technical Enforcement Guidance Document, (OWPE/OSWER), September 1986.

[34] For CERCLA actions which involve treatment, storage, or disposal of RCRA hazardous waste after July 26, 1982, the 40 CFR Part 264 standards promulgated on that date will generally be applicable. If RCRA hazardous waste was treated, stored, or disposed at the site before the effective date of these Part 264 standards, the Part 264 standards would not be applicable if the CERCLA action does not involve current treatment, storage, or disposal, but may be relevant and appropriate.

[35] Placement of upgradient (background) monitoring wells and RCRA procedures for sampling and analysis are described in guidance for implementing 40 CFR Part 264 Subpart F. These procedures and guidance, however, are not ARAR, but may be considered in the development of ground-water monitoring plans at CERCLA sites.

the specific circumstances at a given site. When contaminated ground water is identified, the program undertakes an analysis to determine the characteristics of that ground water, using the framework laid out in EPA's Ground-Water Protection Strategy and EPA's Ground-Water Classification Guidelines as a guide. Remediation levels are then established for the site based on an analysis of ARARs and other requirements "to-be-considered" in determining protective levels. Alternative time frames for cleanup and different technologies that might be employed to achieve the selected remediation level should then be considered and analyzed against a series of criteria (the Superfund approach is discussed in greater detail in Chapter 5).

The requirements of 40 CFR Part 264 come into play as ARARs are analyzed as part of determining the appropriate remediation level for a site. 40 CFR §264.94 established three categories of ground water protection standards which are considered by Superfund as potentially applicable or relevant and appropriate requirements: background concentrations, RCRA Maximum Concentration Limits (MCLs), and Alternate Concentration Limits (ACLs). In general, Superfund will find MCLs under the Safe Drinking Water Act (SDWA MCLs) the relevant and appropriate requirements for most sites. In complying with SDWA MCLs, cleanup will also be consistent with RCRA MCLs. When no MCL has been established, Superfund remedial actions substantively meet RCRA Subpart F requirements in one of two ways. In general, for ground waters with the characteristics of Class I and II aquifers (i.e., those whose beneficial use will be as drinking water supply), the Superfund program establishes a remediation level that is the equivalent of a <u>health-based</u> (i.e., assuming human exposure) ACL under RCRA. For ground waters with the characteristics of Class III (i.e., cannot be used as drinking water because of high salinity or naturally occurring widespread contamination) and where MCLs would not be relevant and appropriate, Superfund establishes levels consistent with <u>exposure-based</u> (i.e., assuming low likelihood of human exposure) ACLs under RCRA. Background levels will generally not be adopted by the Superfund program in establishing remediation levels in Class III ground waters.

The procedure for establishing site-specific ACLs under RCRA is specified in 40 CFR §264.94, and requires a finding that the hazardous constituent in the ground water will not pose a substantial present or potential hazard to human health or the environment as long as the ACL is not exceeded. Consideration of numerous factors is required, affecting primarily:

- Potential adverse effects on ground-water quality, taking into consideration physical and chemical characteristics of the waste, hydrogeological characteristics of the setting, the quantity and direction of ground-water flow, proximity and withdrawal rate of ground-water users, current and future uses of ground water, the existing quality of the area ground water, including other sources of contamination, the potential for health risks, the potential for other damage, the persistence and permanence of adverse effects; and

- Potential adverse effects on hydraulically-connected surface water, taking into consideration factors similar to those listed above.

In evaluating use of ACLs, Superfund considers these and other factors in establishing site-specific remediation levels.

CERCLA §121(d)(2)(B)(ii) provides a set of three additional conditions limiting the use of ACLs at Superfund sites where MCLs would otherwise be applicable or relevant and appropriate. The statute prohibits use of any process for establishing ACLs for hazardous constituents in ground water (where there is not a projected entry into surface water) for purposes of an on-site cleanup that assumes a point of human exposure beyond the boundaries of the facility, except where three specific conditions are met: "(1) There are known and projected points of entry of such groundwater into surface water; and (2) on the basis of measurements or projections, there is or will be no statistically significant increase of such constituents from such groundwater in such surface water at the point of entry or at any point where there is reason to believe accumulation of constituents may occur downstream; and (3) the remedial action includes enforceable measures that will preclude human exposure to the contaminated groundwater at any point between the facility boundary and all known and projected points of entry of such groundwater into surface water." If the conditions are met, the assumed point of human exposure may be at such known and projected points of entry.

CHAPTER 3

GUIDANCE FOR COMPLIANCE WITH CLEAN WATER ACT REQUIREMENTS

3.0 INTRODUCTION

This chapter addresses CERCLA compliance with Clean Water Act (CWA) applicable or relevant and appropriate requirements (ARARs) in remedial actions.[1] The CWA has distinct regulatory features that include site-specific pollutant limitations and performance standards which are applied primarily for protection of surface water quality (e.g., regulating point and non-point source discharges to surface water).[2] Unlike the RCRA program described in Chapter 2, the CWA does not have specific technology design and operating requirements that can be linked to specific remedial technologies. It does, however, have effluent limitations guidelines and standards supported by technological bases for specified industrial categories, that may be relevant and appropriate to CERCLA actions.

This chapter provides guidance for CERCLA site personnel based upon the type of effluent discharge activity likely to occur at CERCLA sites.[3] Several types of discharges regulated under the CWA could occur at a CERCLA site: direct discharge to surface water or to oceans, indirect discharge to a publicly owned treatment works (POTW), and discharge of dredged or fill material into the waters of the U.S. (including wetlands). This chapter is organized into four sections:

- Section 3.1 provides a general overview of the provisions of the CWA and how they are implemented;
- Section 3.2 provides guidance for compliance with direct discharge requirements;
- Section 3.3 provides guidance for compliance with indirect discharge requirements; and
- Section 3.4 provides guidance for compliance with dredge and fill requirements.

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[1] The requirements of CERCLA §121 generally apply as a matter of law only to remedial actions. However, as a matter of policy, EPA will attain ARARs to the greatest extent practicable considering the exigencies of the situation at the site when carrying out removal actions.

[2] Water quality criteria under the CWA may also be relevant and appropriate to cleanup of surface and ground water per CERCLA §121(d)(2)(B)(i).

[3] Section 118(a)(2) of the CWA as amended by the Water Quality Act of 1987 specifically requires EPA to "...take the lead in the effort to meet..." the goals embodied in the Great Lakes Water Quality Agreement (GLWQA) with particular emphasis on goals related to toxic pollutants. The provisions of the GLWQA will be very pertinent to sites having discharges to the Great Lakes drainage basin.

3.0.1 ON-SITE ACTIONS: COMPLIANCE WITH SUBSTANTIVE REQUIREMENTS

CERCLA §121(e) states that no Federal, State or local permit (e.g., a permit for a direct discharge to surface waters) is required for the portion of any removal or remedial action conducted entirely on-site. This permit exemption also applies to any activities that occur on-site prior to the response action (e.g., pump tests during the RI/FS).[4] For purposes of this guidance, a direct discharge of Superfund wastewaters would be "on-site" if the receiving water body is in the area of contamination or is in very close proximity to the site and necessary for implementation of the response action (even if the water body flows off-site).

Superfund sites are not required to comply with administrative requirements associated with the permitting process for on-site actions. However, remedies selected must be protective of human health and the environment, and must meet substantive requirements under any Federal environmental law or more stringent promulgated State environmental or facility siting law that are identified as applicable or relevant and appropriate.

It is the responsibility of the lead agency to ensure that substantive requirements for direct on-site discharges to surface waters and other on-site actions are identified and complied with even though a permit incorporating that standard of control is not required. In most cases, this responsibility can be carried out effectively if the appropriate Regional and State Water personnel are involved early and continuously in the Superfund process. Section 3.2.4 provides more detailed guidance on such coordination.

3.0.2 OFF-SITE ACTIONS: COMPLIANCE WITH SUBSTANTIVE AND ADMINISTRATIVE REQUIREMENTS

Off-site discharges from CERCLA sites directly to receiving waters or indirectly to POTWs must comply with applicable Federal, State and local substantive requirements and are not exempt from formal administrative permitting requirements.[5] The formal administrative permitting requirements for off-site direct discharges are described further in section 3.2.5.

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[4] EPA interprets "on-site" for permitting purposes to mean the areal extent of contamination and all suitable areas in very close proximity to the contamination necessary for implementation of the response action. Actions taken by EPA, other Federal agencies, States or private parties undertaking removal or remedial actions under CERCLA §§104, 106, or 122 are covered by the §121(e) permit exemption.

[5] The term "indirect discharge" is used when a source discharges waste to a POTW that treats the waste. Often, the POTW then discharges the treated wastewater to receiving waters.

3.1 OVERVIEW OF THE CLEAN WATER ACT

The objective of the Clean Water Act (CWA) is to restore and maintain the chemical, physical, and biological integrity of the nation's waters. This objective is achieved through the control of discharges of pollutants to navigable waters. This control is implemented through the application of Federal, State and local discharge standards. This section provides an overview of the CWA including a discussion of the regulated sources and pollutants, limitations and standards, and how limitations and standards are applied to regulated sources. A summary discussion of specific CWA provisions is provided in the Appendix.

3.1.1 REGULATED SOURCES AND POLLUTANTS

The CWA prohibits the unpermitted discharge of any pollutant or combination of pollutants to waters of the United States from any point source.[6] A point source is defined as:

> . . . any discernible, confined, and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, . . . from which pollutants are or may be discharged. (40 CFR §122.2)

A pollutant is defined for regulatory purposes to include:

> . . . dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewer sludge, munitions, chemical wastes, . . . and industrial, municipal, and agricultural waste discharged into water. (40 CFR §122.2)

All pollutants are regulated under the CWA. For the purpose of regulation, CWA §301(b)(2) divides the pollutants into the following three categories:

- <u>Priority pollutants</u>: the 126 individual toxic pollutants contained in 65 toxic compounds or classes of toxic compounds adopted by EPA pursuant to Section 307(a)(1) of the CWA, including, for example, asbestos, benzene, and chloroform;

- <u>Conventional pollutants</u>: pollutants classified, pursuant to CWA §304(a)(4), as biochemical oxygen demanding (BOD), total suspended solids (TSS), fecal coliform, oil and grease, and pH; and

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[6] "Waters of the U.S." is defined broadly in 40 CFR §122.2 and includes essentially any water body (including navigable waters) and most wetlands.

- Nonconventional pollutants: any pollutant not identified as either conventional or priority, i.e., ammonia nitrogen, chemical oxygen demand (COD), total organic carbon, total solids, and nonpriority toxic pollutants (40 CFR 122.21(1)(2)).

3.1.2 LIMITATIONS AND STANDARDS

The CWA requires the establishment of guidelines and standards to control the direct or indirect discharge of pollutants to waters of the U.S. Effluent limitations developed for the pollutants regulated under the CWA are applied to point source dischargers on a case-by-case basis. The standards required by the CWA, and the regulations promulgated to implement these standards (discussed in greater detail in sections 3.2, 3.3, and 3.4), include:

- Technology-Based Guidelines and Standards. The standards of control for direct discharges are derived from Title III of the CWA. CWA §301(b) requires all direct dischargers to meet technology-based requirements. These requirements include, for conventional pollutants, application of the best conventional pollutant control technology (BCT), and for toxic and nonconventional pollutants, the best available technology economically achievable (BAT).[7] EPA has determined the technology-based requirements through effluent limitations guidelines for specific categories of industries, which are transformed into specific discharge limits by permit writers. Where effluent guidelines for a specific industry or industrial category do not exist, e.g., CERCLA sites, BCT/BAT technology-based treatment requirements are determined on a case-by-case basis using best professional judgment (BPJ). Once the BPJ determination is made, the numerical effluent discharge limits are derived by applying the levels of performance of a treatment technology to the wastewater discharge.

- Water Quality Criteria. CWA §304 requires EPA to publish water quality criteria for specific "pollutants, or their byproducts." EPA develops two kinds of water quality criteria: one for protection of human health and another for protection of aquatic life. Federal

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[7] BAT is the major national method of controlling the direct discharge of toxic and non-conventional pollutants to waters of the U.S. Effluent limitations achieved through application of BAT represent the best economically achievable performance of plants within an industrial category or subcategory. BCT is the level of technology control developed for conventional pollutants.

water quality criteria are non-enforceable guidelines used by States to set water quality standards for surface water. To date a total of 82 water quality criteria documents have been made available from the National Technical Information Service (NTIS). EPA has published notice of these documents as they have become available (45 FR 79318, November 28, 1980; 49 FR 5831, February 15, 1984; 50 FR 30784, July 29, 1985; 51 FR 22978, June 28, 1986; 51 FR 43665, December 3, 1986; 51 FR 8012, March 7, 1986; 52 FR 6213, March 2, 1987). Water quality criteria may be relevant and appropriate to cleanup of surface and ground water at CERCLA sites (CERCLA §121(d)(2)(B)(i)).

- Water Quality Standards. CWA §303 requires States to develop water quality standards based on Federal water quality criteria to protect existing and attainable use or uses (e.g., recreation, public water supply) of the receiving waters. CWA §301(b)(1)(C) requires that pollutants contained in direct discharges be controlled beyond BCT/BAT equivalents when necessary to meet applicable water quality standards. Where State standards contain numerical criteria for toxic pollutants, appropriate numerical discharge limitations may be derived for the discharge. Where State standards are narrative, e.g., "no toxic materials in toxic amounts," either the whole-effluent or the chemical-specific approach is generally used as the standard of control.

- Ocean Discharge Regulations. CWA §403 prohibits discharges into marine waters without an NPDES permit. A permit will not be issued if the discharge will cause unreasonable degradation to the marine environment. The permit, issued pursuant to 40 CFR Part 125, Subpart M, may contain monitoring requirements and effluent discharge limitations based upon limiting permissible concentrations described in 40 CFR Part 227, Subpart G. Substantive requirements of ocean discharge regulations are potential ARARs for on-site CERCLA actions.

- Pretreatment Standards. CWA §307(b) requires the establishment of pretreatment standards for the control of pollutants discharged into POTWs by industrial and other nondomestic sources, i.e., indirect dischargers. The purpose of the standards is to prevent the discharge of pollutants that pass through (are not susceptible to treatment by the POTW) or interfere with the POTW (inhibit or destroy the operations, contaminate sludge, or endanger the health of POTW workers). For many

industries, EPA has promulgated national categorical pretreatment standards for toxic pollutants. However, such standards do not cover all industrial categories or regulate all of the pollutants discharged to POTWs. Therefore, EPA's regulations further impose general prohibitions (pass through and interference) and specific prohibitions (see section 3.3.1) on indirect discharges. These prohibitions apply directly to all nondomestic sources and are implemented through the development and enforcement of local limits, i.e., pretreatment requirements applied to wastewater discharges before they reach the POTW.

- Dredge and Fill Standards. CWA §404 regulates the discharge of dredged or fill material into waters of the U.S. This program is implemented through regulations set forth at 33 CFR Parts 320 through 330 and 40 CFR Part 230. These regulatory requirements ensure that proposed discharges are evaluated with respect to impacts on the aquatic ecosystem. The benefits that reasonably may be expected to accrue from the dredge and fill activity must be balanced against its reasonably foreseeable detriments (see section 3.4.3). Section 103 of the Marine Protection Research and Sanctuaries Act regulates discharge of dredged material into oceans.

3.2 GUIDANCE FOR COMPLIANCE WITH DIRECT DISCHARGE REQUIREMENTS

3.2.1 TYPES OF DIRECT DISCHARGES

Several types of cleanup activities could be considered "direct discharges" from a point source under the CWA. These activities, which trigger action-specific requirements for the discharge, include:

- On-site waste treatment in which wastewater[8] is discharged directly into a surface water body in the area of contamination or in very close proximity to this area via a pipe, ditch, conduit, or other means of "discrete conveyance."

- Off-site treatment in which wastes from the site are piped or otherwise discharged through a point source to an off-site surface water.

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[8] Wastewater may include contaminated ground water pumped, treated, and discharged to surface water.

- Any remedial action in which site runoff would be channeled directly to a surface water body via a ditch, culvert, storm sewer, or other means.

It should be noted that contaminated ground water that naturally flows into surface waters is not considered a point source discharge. However, such contaminated ground water which enters a surface water may be subject to Federal water quality criteria or State water quality standards.

3.2.2 OVERVIEW OF NPDES PERMITS

The National Pollutant Discharge Elimination System (NPDES) program is the national program for issuing, monitoring, and enforcing permits for direct discharges. The CWA established the NPDES permit program under §402 of the Act to implement the regulations, limitations, and standards promulgated pursuant to §§301, 304, 306, 307, 308, and 403 of the CWA for point source direct discharges. The NPDES program is implemented under 40 CFR Parts 122-125. NPDES permits contain applicable effluent standards (i.e., technology-based and/or water quality-based), monitoring requirements, and standard and special conditions for discharge. The NPDES program is administered by EPA and by State agencies authorized by EPA to administer a State program equivalent to the Federal NPDES program. Regardless of whether States are authorized to administer the NPDES program, they may establish more stringent requirements than those contained in the Federal program.

3.2.3 GUIDELINES FOR DETERMINING SUBSTANTIVE REQUIREMENTS

Both on-site and off-site discharges from CERCLA sites to surface waters are required to meet the substantive CWA NPDES requirements, including discharge limitations, monitoring requirements, and best management practices. These requirements will be contained in an NPDES permit for off-site CERCLA discharges (see section 3.2.5). For on-site discharges from a CERCLA site, these substantive requirements must be identified and complied with even though an NPDES permit will not be obtained. The following sections describe the substantive requirements of the CWA as implemented through the NPDES program.

3.2.3.1 Technology-Based Standards

The wastewater treatment technologies proposed in considering alternatives for a CERCLA site are required to meet BCT/BAT requirements (see section 3.1.2). Due to the lack of national effluent limitations guidelines for CERCLA site wastewater discharges, technology-based effluent limitations have to be imposed on a case-by-case basis. Therefore, best professional judgment (BPJ) is used to identify BCT/BAT equivalent discharge requirements.

During an initial BPJ evaluation, a proposed CERCLA response alternative should be reviewed to ensure the use of treatment technologies that have been proven effective to treat the pollutants or classes of pollutants present in the

CERCLA site wastewater (see p. 3-36, Exhibit 3-1 which is a list of the development documents that provided the basis for the BAT categorical standards). Then, numerical effluent limitations or treatment efficiency requirements can be developed for the specific situation (section 3.2.4 addresses how to coordinate with water program offices in order to identify substantive requirements). Factors that must be evaluated to determine the appropriateness of the selected technology as BCT/BAT include the process employed, the engineering aspects of the application of various types of control techniques, process changes, the cost of achieving such effluent reduction, non-water quality environmental impact, and other appropriate factors.[9] (See CWA §304 and 40 CFR §§122 and 125.3(c)(3)). RPMs will follow a process similar to a BPJ determination in developing numerical effluent limitations. State or Regional water quality staff may be consulted during the development of effluent limitations.

A direct method for initially establishing effluent discharge limits for direct discharges on a case-by-case basis is to identify and use existing data on the application of treatment technologies to the classes of wastes found at CERCLA sites. The data needed to apply existing treatment technology performance to a CERCLA site include the following:

- Description of wastes;
- Concentration of pollutants in waste;
- Engineering information - flow rates, volume, treatability information; and
- Expected treatment (removal/destruction) efficiency.

In general, the considerations involved in using technology-based information to set case-by-case discharge limits include the following:

- Performance data should be based on the removal of identical or chemically similar pollutants to those found in the CERCLA discharge;
- Performance data should pertain to the treatability of wastewaters containing approximately the same pollutant concentration levels as those found in the CERCLA discharge;

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[9] In determining BAT for a specific source, costs are considered but are generally not balanced against pollutant removal benefits. In determining BCT, the reasonableness of the relationship between the costs of obtaining a reduction in effluents and the effluent reduction benefits is considered. Further, this relationship is compared to the cost and level of reduction of such pollutants by a POTW.

- Compositional differences between the CERCLA discharge and the discharge for which treatability data are available should be noted;

- The variability in pollutant concentration levels in the CERCLA discharge may affect treatability; and

- Major differences between the average flow of the discharge for which treatability data exist and the average flow of the CERCLA discharge should be noted.

As mentioned above, in order to effectively assess wastewater treatability using technology-based limitations, available performance data should be obtained which document the efficiency of existing treatment technologies in treating wastewater of similar composition. If such data is not available, pilot tests may have to be conducted. Treatment technologies are usually geared toward the removal of general classes of pollutants (e.g., air stripping units remove volatile organics). Removal efficiencies for specific pollutants within any general category may vary when using any particular treatment technology and may necessitate close control (e.g., pH adjustment for precipitation of metals).

Further guidance regarding the use of BPJ to develop technology-based discharge limitations can be found in the following Agency guidance manuals:

- Training Manual for NPDES Permit Writers, March 1986.

- Development of Case-By-Case Discharge Permits Under the NPDES and Pretreatment Programs (Draft), U.S. EPA, Region 8, October 1986.

- Developing Requirements for Direct and Indirect Discharges of CERCLA Wastewater (Draft), March 1987.

3.2.3.2 Water Quality Criteria

CERCLA §121 states that hazardous substances, pollutants, or contaminants left on-site at the conclusion of the remedial action shall attain Federal water quality criteria where they are relevant and appropriate under the circumstances of the release or threatened release. CERCLA §121(d)(2)(B)(i) requires that this determination is to be based on the designated or potential use of the water, the media affected, the purposes of the criteria, and current information.

Whether a water quality criteria is relevant and appropriate depends on the use(s) designated by the State, which is based on existing and attainable uses, and whether the water quality criteria is intended to be protective of that use. Water quality criteria for protection of human health identify protective levels from two routes of exposures -- exposure from drinking the water and from consuming aquatic organisms, primarily fish, and from fish consumption alone.

Therefore, in waters designated as a public water supply, a water quality criteria reflecting drinking the water would be relevant and appropriate; the criteria that reflects fish consumption and drinking the water should be used if fishing is also included in the State's designated use. If the State has designated a water body for recreation, a water quality criteria reflecting fish consumption alone may be relevant and appropriate if fishing is included in that designation. Generally, water quality criteria are not relevant and appropriate for other uses, such as industrial or agricultural use, since exposures reflected in the water quality criteria are not likely to occur.

Water quality criteria without modification are not relevant and appropriate in selecting cleanup levels in ground water, since consumption of contaminated fish is not a concern. However, a water quality criteria adjusted to reflect only exposure from drinking the water may be useful in selecting a cleanup level.

MCLs represent the level of quality EPA has determined to be safe for drinking and are generally relevant and appropriate for ground water that is or may be used for drinking and for surface water designated as a current or potential drinking water supply. Therefore, when a promulgated MCL exists, the water quality criteria for that pollutant would not be relevant and appropriate.

A water quality criteria for protection of aquatic life may be relevant and appropriate for a remedy involving surface waters (or ground water discharges to surface waters) when the designated use requires protection of aquatic life or when environmental concerns exist at the site. The presence of organisms more sensitive than those represented in the toxicological data base from which the national criteria were derived, or exposure of organisms to multiple toxic substances with additive or synergistic toxic effects may require application of more stringent criteria.[10] In addition, if protection of human health and aquatic life are both a concern, the more stringent standard or criterion should generally be applied.

If a State has promulgated a numerical water quality standard for a given chemical and use, the State standard would generally be relevant and appropriate rather than a water quality criteria, because it essentially represents a site-specific adaptation of a water quality criteria.

If a State has not designated uses for a surface water, whether a water quality criteria is relevant and appropriate should be based on a site-specific decision about the existing and attainable uses of the water body, considering similar criteria used by States in designating uses and in consultation with the State.

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[10] For example, the water quality criteria for cadmium for the protection of freshwater aquatic organisms may, in fact, not be stringent enough to protect brown and brook trout. (50 FR 30784, July 29, 1985.)

In addition, CERCLA §121(d)(2) requires that, in determining whether a water quality criteria is relevant and appropriate, the latest information available be considered. Thus, a water quality criteria may be relevant but not appropriate if its scientific basis is not current. To ensure that a water quality criteria is current, consult with the Regional Water Program office and the EPA IRIS (see Footnote 21, p. 1-76).[11]

3.2.3.3 Water Quality Standards

In addition to technology-based limits, CWA §402(a)(1), through reference to CWA §301, requires that all NPDES permits include effluent limitations to ensure that State ambient water quality standards are met in the receiving water body at all times.[12] Section 303 of the CWA requires States to promulgate water quality standards. Such ambient State standards will be applicable to CERCLA discharges in combination with Federal BCT/BAT requirements which regulate the discharge.

State water quality standards are composed of:

- Use Classification

Use classifications describe the existing and attainable uses for waters within State boundaries. Although a State may develop its own classification scheme, designated uses generally include:

- Recreation;
- Protection and propagation of fish and aquatic life;
- Agricultural and industrial uses;
- Public water supply; and
- Navigation.

- Numerical and/or narrative standards

For each designated use, States are required to establish numerical or narrative water quality standards necessary to protect the designated use; such standards are subject to EPA review. (The standard may be a method for determining numerical discharge limitations, rather than the number itself.) Discharges of CERCLA wastewater must comply with these promulgated standards.

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[11] Exhibit 1-1 presents the Federal water quality criteria for priority pollutants. A summary of water quality criteria developed for protection of fish and other aquatic life (fresh water, marine, and estuarine) and for protection of human health may be found in Quality Criteria for Water 1986, EPA 440/5-86-001, May 1, 1986 (51 FR 43665) - commonly referred to as the "Gold Book."

[12] CWA §401(a)(2) requires that a discharge conform to applicable water quality requirements where the discharge affects a State other than the State issuing the NPDES permit.

Numerical State water quality standards are usually based on Federal ambient water quality criteria developed by EPA, which are also considered to be potentially relevant and appropriate under CERCLA §121(d)(2)(A)(ii) (see section 3.2.3.2). States may use ambient water quality criteria in setting water quality standards, or may set more or less stringent standards, as necessary to protect designated uses.

Many State water quality standards include narrative criteria to regulate discharges of toxic pollutants. In general, these narrative criteria prohibit the discharge of toxic pollutants in toxic amounts, or set a standard at a percentage (often 10 percent) of the lowest concentration that will kill 50 percent of the aquatic organisms (LC50) in a standard test. Under the CWA, "toxic" pollutants are the priority pollutants (listed in Table 1 of the CWA). However, toxic pollutants which are referred to in State water quality standards are not limited to those listed in the CWA.

EPA has issued a "Policy for the Development of Water Quality-Based Permit Limitations for Toxic Pollutants" (49 FR 9016, March 9, 1984). Generally, this policy states that toxic pollutants contained in direct discharges will be controlled beyond BCT/BAT equivalents in order to meet applicable water quality standards. The use of an integrated strategy consisting of both biological and chemical methods is recommended to control toxic discharges from direct sources.

Two general approaches are used to develop water quality-based toxics controls: the whole-effluent approach and the chemical-specific approach. The whole effluent approach considers the effect on the receiving stream of all toxic constituents in a complex wastewater. This is tested by determining the effects of the effluent on standard test animals. One or a combination of the following procedures should be used when implementing the whole effluent approach:

- Set discharge limitation for whole effluent toxicity by using methods set forth in Federal guidance for water quality-based toxics control.[13]

- Develop whole effluent toxicity monitoring requirements (e.g., the requirement to submit appropriate bioassays to demonstrate that the in-stream concentration of the effluent will be less than the no observable effect level, or NOEL).

- Evaluate monitoring results and then determine whether to develop toxicity limits where necessary in the absence of specific State toxicity standards. The

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[13] See Technical Support Document for Water Quality-Based Toxics Control (September 1985); A Permit Writers Guide to Water Quality-Based Permitting for Toxics Pollutants (February 1987.)

wastewater that shows a problem must be treated in order to reduce the concentration of toxics in the wastewater to a level less than that which causes an instream effect.

The chemical-specific approach to toxics control is used where the discharge constituents are well-defined. Water quality criteria or State water quality standards can be used to limit specific toxicants directly (i.e., the effluent discharge limitation will reflect numerical criteria for specific toxic pollutants). Federal water quality advisories may also be helpful in setting limits for specific chemicals.

All CERCLA sites where technology-based controls are not adequate to achieve water quality standards in the receiving water body should be considered for water-quality based toxics controls, including numerical toxicity limits and whole effluent limits. The impact of CERCLA discharges could be particularly critical on (1) a receiving water known to exhibit severe impacts on resident biota, (2) a receiving water in which the designated use is not being achieved, or (3) a particularly valuable or sensitive receiving water (e.g., a wildlife/ recreation area) or an area of biological importance (e.g., a fishing ground).

It is important to note that a combination of factors must be evaluated when deciding if water quality-based toxics controls are necessary for a particular CERCLA site discharge. The presence or absence of unacceptable effluent toxicity is sometimes highly variable. The toxicity of an effluent (and the subsequent need for toxics control) is dependent on many factors including:

- Toxicity of materials;
- Treatment system used;
- Treatability of chemicals in the effluent;
- Soundness of best management practices;
- Variability of effluent composition and concentration;
- Capacity of treatment system; and
- Actual retention time of the treatment system.

Coordination with Water Program offices is strongly recommended to ensure that water quality-based controls, if applicable, are properly implemented to adequately protect the receiving waters (see section 3.2.4). Guidance for implementing narrative State water quality standards, including effluent

toxicity testing monitoring requirements, can be found in EPA guidance manuals.[14]

3.2.3.4 Antidegradation Policy

In addition to numerical and narrative State water quality standards, each State is required to develop and adopt a statewide antidegradation policy and identify the methods for implementing such a policy (40 CFR §131.12).

The objectives of the antidegradation policy are to:

- Protect existing uses of waters;
- Maintain the water quality level where it exceeds that which is necessary to support existing uses; and
- Protect high quality waters that constitute an outstanding national resource, such as waters of national significance and state parks and wildlife refugees.

CERCLA discharges to high quality receiving waters could be prohibited or limited if protective standards have been promulgated under the antidegradation policy. These standards are commonly incorporated in the State's surface water quality protection statutes.

3.2.3.5 Requirements Regarding Water Quality Standards Imposed by the 1987 Amendments to the CWA

RPMs should be alert to possible changes in water quality standards. Pursuant to Section 308 of the 1987 Amendments to the CWA, States must, within two years of enactment of the 1987 Amendments, identify those water bodies within or adjacent to the State that will not meet State water quality standards because of toxic pollutants even after the implementation of BAT, new source performance standards, and pretreatment standards. For each segment of water bodies identified, the State is to determine the specific point sources discharging toxic pollutants (and the amount of such discharge) that are believed to be preventing or impairing the desired water quality. Further, the State is required to develop an individual control strategy, subject to EPA approval, that will produce a reduction in the discharge of toxic pollutants from the identified point sources. The control strategy will include the establishment of effluent limitations and water quality standards containing numerical criteria.

The proposed strategy, in combination with other controls on point and nonpoint sources, must achieve the applicable water quality standard as soon as

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[14] See Footnote 13.

possible, but not later than 3 years after the establishment of the strategy. If the State fails to submit an approvable strategy, EPA, with the cooperation of the State, will develop a strategy meeting the requirements of the Act. The section provides for judicial review of individual control strategies under CWA §509.

Further, as the State reviews, revises, or adopts water quality standards, CWA §304(l) requires that the State adopt criteria for all toxic pollutants listed pursuant to CWA §307(a) for which criteria have been published under CWA §304(a), the discharge or presence of which pollutant interferes with designated uses. The State's standards are to be based on specific numerical criteria. Where numerical criteria are not available, a process that results in a site-specific numerical unit for specific chemicals may be included in permits.[15] The State may also adopt criteria based on biological monitoring or assessment methods.

3.2.3.6 Ocean Discharge Standards

CWA §403 requires that an NPDES permit for a discharge into marine waters located seaward of the inner boundary of the territorial seas (i.e., State and Federal offshore waters) be issued in accordance with guidelines for determining the degradation of the marine environment.[16] This section provides guidance on the substantive permit requirements which must be met for on-site CERCLA actions when applicable or relevant and appropriate. The intent of CWA §403 and these guidelines, referred to as the Ocean Discharge Criteria (40 CFR Part 125, Subpart M), is to "prevent unreasonable degradation of the marine environment and to authorize imposition of effluent limitations, including a prohibition of discharge, if necessary, to ensure this goal".[17]

An NPDES permit will not be issued (or an on-site discharge will not be allowed) unless limits can be established that will prevent unreasonable degradation or irreparable harm. The factors that must be evaluated in determining whether a discharge will degrade marine waters include the following (40 CFR §125.122):

- Quantities, composition, and potential for bioaccumulation or persistence of the pollutants;
- Potential transport of pollutants by biological, chemical, or physical processes;

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[15] 48 FR 51400, November 8, 1983.

[16] Ocean discharge criteria are implemented through the CWA §402 NPDES program as outlined in 40 CFR §§125.120-125.124.

[17] 45 FR 65942, October 3, 1980.

- Composition and vulnerability of exposed communities;
- Importance of the receiving water to spawning, migratory paths, and the surrounding biological community;
- Existence of special aquatic sites;
- Potential effect on human health;
- Existing or potential recreational commercial fishing;
- Applicable requirements of the Coastal Zone Management Plan;[18] and
- Marine water quality criteria developed pursuant to CWA §304(a)(1).

If a determination of unreasonable degradation cannot be made because of a lack of sufficient information, EPA must then determine whether a discharge will cause irreparable harm to the marine environment which will not be reversed after cessation or modification of the discharge and whether there are reasonable alternatives to ocean disposal. To assess the probability of irreparable harm, EPA is required to make a determination that the discharger, operating under appropriate permit conditions, will not cause permanent and significant harm to the environment during a monitoring period in which additional information is gathered. If data gathered through monitoring indicate that continued discharge may cause unreasonable degradation, the discharge shall be halted or additional permit limitations established.

One approach to conducting a CWA §403(c) evaluation for any discharger is to identify the pollutants of concern in the effluent, determine their fate in the environment, and assess their potential effects on marine communities, considering the factors listed under 40 CFR §125.122 (see above). Site-specific information is essential in order to identify sensitive or critical marine resources and habitats.

In addition to the monitoring requirements under 40 CFR §125.123(d), the NPDES permit for ocean discharges will also include a requirement that the discharge must comply with the limiting permissible concentrations (LPCs) at the mixing zone boundary. Under 40 CFR §227.22, LPCs are established for solid, liquid, and suspended particulate phases of a discharge.[19] Specific information

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[18] Volume 3 of this compliance manual, currently under development, will discuss the requirements of the Coastal Zone Management Plan.

[19] Liquid phase LPCs are based on applicable marine water quality criteria or upon bioassay results and are set at levels that will not cause unreasonable acute or chronic toxicity or other sublethal adverse effects and that will not

may be required (40 CFR §125.124) for evaluating proposed ocean discharges to an ocean including:

- Analyses of chemical constituents of the discharge and the potential effect on the biological community;
- Appropriate bioassays necessary to determine LPCs;
- Identification of critical habitats (e.g., spawning sites);
- Computer modeling of the dilution and dispersion of the discharge plume;
- Facility and treatment process description; and
- Evaluations of alternative disposal options.

3.2.3.7 Other Substantive Requirements

In addition to the discharge limitations described above, the NPDES permit program establishes other substantive requirements for the direct discharge of pollutants to surface waters that may be applicable or relevant and appropriate to circumstances at a site. These NPDES permit requirements are contained in 40 CFR Parts 122-125 and include:

- Monitoring. As required in 40 CFR §122.44(i), continued compliance with applicable NPDES discharge limitations is ensured through the establishment of monitoring requirements for the discharger. The regulation requires monitoring of the mass (or other specified measurement) of each pollutant regulated and the volume of effluent discharged from each point source. Other monitoring requirements include designation of monitoring points, monitoring frequency, sample types, and analytical methods. In addition to monitoring for regulated pollutant parameters, monitoring may be required for other pollutants of concern. These additional monitoring requirements are developed on a case-by-case basis. Consistent with the suggested CERCLA/Water coordination procedures described in section 3.2.4 below, RPMs should provide copies of monitoring reports in a form usable by the appropriate Water Office for input to the Permit Compliance System (PCS). The PCS is a computerized system that tracks NPDES discharges and assists the Water Office in determining whether water quality standards are being maintained.

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result in accumulation of toxic materials in the human food chain.

- Best Management Practices. In addition to standard discharge limits, best management practices (BMP) provisions can be required on a case-by-case basis (40 CFR §125.103(b)). These requirements can be incorporated into the NPDES permit and/or the CERCLA site decision documents. BMPs are actions or procedures to prevent or minimize the potential for the release or discharge of toxic pollutants or hazardous substances in significant amounts. BMPs, although normally qualitative, are most effective when used in conjunction with numerical effluent limits. Specific goals of BMP provisions include ensuring that a discharger institutes good housekeeping practices, ensuring proper chemical storage, and controlling contaminated site runoff, leachate and drainage from material storage areas, sludge and waste disposal, and spills and leaks.[20]

3.2.4 COORDINATION BETWEEN CERCLA (SUPERFUND) AND WATER OFFICES FOR ON-SITE ACTIONS

RPMs will identify ARARs where a treatment technology is being considered which involves on-site direct discharges to surface waters. In order to do so correctly and in a timely manner, each EPA Region should establish procedures, protocols or memoranda of understanding that, while not recreating the administrative and procedural aspects of a permit, ensure early and continuous cooperation and coordination between the Regional Superfund and Water offices. Moreover, State Superfund and Water Program offices should be involved where there is a State-lead action or where the State has been delegated NPDES authority. Coordination among all appropriate offices should be established. However, the Regional Superfund and Water offices should maintain their involvement in all actions. The Water Program offices' experience in applying standards of control under the CWA to industrial discharges is a valuable resource for Superfund.

The process of identifying ARARs for remedial actions essentially begins after the site characterization (during the remedial investigation) and may continue through the remedial design phase. ARARs are identified in increments of increasing certainty as more information regarding the site is developed. The appropriate scope and extent of each Region's coordination procedures for identifying ARARs should be determined by the Region. It is recommended that the procedures describe the roles and responsibilities of the respective offices in relation to the steps in the Superfund selection of remedy process. The description of roles and responsibilities should identify those steps where coordination will occur, the level of involvement anticipated for each of these steps, e.g., written comments at certain stages, routing procedures, and agreement as to what constitutes timely notification and timely response between Superfund and Water offices (Regional and State). Coordination between the

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[20] See NPDES Best Management Practices Guidance Document, EPA, (June 1981).

Superfund and Water offices is recommended at the following steps in the remedial process:

- o Preliminary Assessment/Site Investigation. If, as a result of the preliminary assessment or site investigation, it appears that a remedial action involving a discharge to surface waters may be considered, copies of pertinent documents should be sent to Water offices (Regional and State, if appropriate). Early notice of possible remedial actions involving discharges to surface waters will allow Water offices to plan their workloads accordingly.

- o Remedial Investigation/Feasibility Study. Water offices should be kept advised as more information regarding the site and the nature of the contamination is developed, e.g., types of wastes, affected media, expected concentrations, and potential treatment technologies. It may be useful to obtain information from Water offices regarding surface water classifications, existing use designations, technology-based requirements, and water quality standards. In addition, preliminary site summaries should be shared with the Water office.

  Further coordination with Water offices should occur when Superfund offices conduct an initial screening of potential remedial alternatives. Water offices may provide advice during the planning of the detailed analysis to be conducted regarding the effectiveness and implementability of treatment alternatives and the environmental fate and effects of the discharge. These detailed analyses should identify Federal and State ARARs so that each alternative can be evaluated. The Water office comments should address, where appropriate, wasteload allocation analyses, treatability studies, monitoring strategies, and effluent limitations and conditions.

  Examples of documents that the Superfund office may want to provide to the Water office are the RI/FS Workplan (draft and final), the RI/FS report, and the proposed plan.

- o Selection of Remedy/Record of Decision. Coordination with Water offices should continue through the selection of remedy stage. When the selected remedy involves a discharge to surface water, the Water offices may be able to provide information that will assist the Superfund office in documenting, in the Record of

Decision, that the selected remedy meets or exceeds ARARs (or other health- or risk-based levels established through a risk assessment when ARARs do not exist or when they are waived).

- Remedial Design/Remedial Action. Input from Water offices may assist the Superfund office in ensuring that the selected remedy is designed to attain and succeeds in attaining or exceeding all ARARs.

General program coordination outside of specific Superfund projects can also be enhanced by the exchange of effluent guidelines development documents, which are the detailed technical bases for the categorical standards (see Exhibit 3-1, p. 3-36), waste treatment literature, revised water quality standards and other documents which are necessary to identify and comply with ARARs.

3.2.5 ADMINISTRATIVE REQUIREMENTS OF THE NPDES PROGRAM

The NPDES program establishes administrative requirements that must be complied with prior to and after permit issuance. These requirements would not be considered ARARs for on-site direct discharges to surface waters because they are administrative in nature. However, they would be requirements to be complied with in the NPDES permitting process for off-site direct discharges to surface waters.[21] These NPDES administrative requirements include:

- Certification: CWA §401 requires that any applicant for a Federal license or permit to conduct an operation that may result in any discharge to navigable waters, shall provide to the licensing/permitting agency a certification from the State that the discharge will comply with applicable provisions of CWA §§301, 302, 303, 306, and 307.

- Permit Application Requirements: A discharge from a CERCLA site is considered a "new discharge" for regulatory purposes under the NPDES program. NPDES regulations (40 CFR §122.29) require that applications for permits for new discharges must be made 180 days before discharges actually begin. The information required in a permit application will be collected during the RI/FS. States with NPDES authority may have slightly different permit application requirements for new discharges. The NPDES regulations require that pollution control equipment must be installed before the new discharge

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[21] The lead agency (or the PRP in the case of enforcement-lead sites) will obtain the NPDES permit from either the State or Federal agency, whichever is authorized to implement the NPDES program.

begins, and compliance must be achieved within the shortest feasible time, not to exceed 90 days.

- Reporting Requirements. The NPDES permit program requires dischargers to maintain records and to report periodically on the amount and nature of pollutants in the wastewaters discharged (40 CFR §§122.44(i) and 122.48). Reports that are typically required include emergency reports (required in cases of noncompliance that are serious in nature) and discharge monitoring reports (routine monitoring reports).

- Public Participation. CERCLA RPMs should also be aware that any NPDES discharge limitations and requirements developed for a CERCLA site are subject to public participation requirements in 40 CFR §124.10, including public notice and public comment.

3.3 GUIDANCE FOR COMPLIANCE WITH INDIRECT DISCHARGE REQUIREMENTS

In general, a discharge to a POTW is considered an off-site activity.[22] Therefore, Superfund is required to comply with substantive and procedural requirements of the national pretreatment program and all local pretreatment regulations before discharging wastewater to a POTW.

3.3.1 PRETREATMENT STANDARDS

The national pretreatment program, authorized under CWA §307(b), controls the indirect discharge of pollutants to POTWs. The goal of the pretreatment program is to protect municipal wastewater treatment plants and the environment from damage that may occur when hazardous, toxic, or other nondomestic wastes are discharged into a sewer system.[23] This objective is achieved through pretreatment of wastewaters discharged by industrial and other nondomestic users (e.g., a CERCLA site) into POTWs.

The general pretreatment regulations, located in 40 CFR Part 403, are intended to control the introduction of pollutants into POTWs so as to:

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[22] Even if CERCLA wastewater is discharged to a sewer located on-site, treatment by a POTW located off-site is considered an off-site activity.

[23] The potential problems to a POTW caused by inadequately treated discharges are diverse and include damages to the POTW's physical facilities, threats to the health and safety of POTW workers, inhibition of POTW treatment processes, the discharge of toxic and other pollutants to the waters of the U.S., contamination of the POTW's sludge, and emission of volatile pollutants from the POTW's sewer and treatment systems into the air.

- Prevent interference with the operation of a POTW;
- Prevent pass through of pollutants through the treatment works; and
- Improve opportunities to recycle and reclaim municipal and industrial wastewater and sludges.

Interference is a discharge that, alone or in conjunction with discharges from other sources, inhibits or disrupts a POTW, its treatment processes or operations, or its sludge processes, thereby causing either a violation of any requirement of the POTW's NPDES permit or prevention of sewage sludge use or disposal.[24]

Pass through is a discharge to a POTW that exits the POTW in quantities or concentrations, which alone or in conjunction with a discharge(s) from other sources, causes a violation of any requirement of the POTW's NPDES permit.

EPA's regulations at 40 CFR §403.5 include general and specific prohibitions on discharges to POTWs. The general prohibitions state that pollutants introduced into POTWs by a non-domestic source shall not cause pass through or interference. The specific prohibitions preclude the introduction of pollutants that:

- Create a fire or explosion hazard in the sewers or treatment works;
- Will cause corrosive structural damage to the POTW (pollutants with a pH lower than 5.0);
- Obstruct flow in the sewer system resulting in interference;
- Are discharged at a flow rate and/or concentration that will result in interference; and
- Increase the temperature of wastewater entering the treatment plant so as to inhibit biological activity resulting in interference (in no case shall the temperature of the POTW increase to above 104°F (40°C)).

Nondomestic users must comply with the general and specific prohibitions. In addition, pursuant to 40 CFR §403.5(c), some POTWs are required to develop and enforce specific effluent limitations (i.e., local limits) to implement the

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[24] Most POTWs are considered direct dischargers and are issued NPDES permits controlling the discharge of their wastewater to receiving waters.

general and specific prohibitions. In addition, the POTW may enforce local prohibitions on wastes with objectionable color, noxious or malodorous liquids, wastes that may volatilize in the POTW (endangering the health and safety of POTW workers), radioactive wastes, and other types of wastes that are incompatible with POTW operations.

The 1987 amendments to the CWA require States to review their water quality standards and, if necessary, develop toxic discharge control programs (see section 3.2.3.5). The amendments also require an increased EPA effort to develop regulations for sludge use and disposal. Both of these efforts may affect discharge limitations under NPDES permits, including POTWs' permits. Revisions to a POTW's NPDES permit may affect existing pretreatment standards. In general, RPMs should maintain awareness of the possibility of such changes.

The national pretreatment standards also specify quantities or concentrations of pollutants or pollutant properties that may be discharged to a POTW by existing or new industrial users in specific industrial subcategories. These categorical standards are not applicable requirements because CERCLA cleanup actions do not presently fit within any industrial category for which such standards exist. However, they may be relevant and appropriate if the considerations underlying the categorical standard (e.g., type and concentration of pollutant, type of industrial process that produced the waste) are sufficiently similar to the conditions of the hazardous substance found at the site. See Exhibit 3-1, p. 3-36 for a listing of development documents that provide the technical basis for the categorical standards.

3.3.2 GUIDANCE FOR DETERMINING WHETHER TO DISCHARGE CERCLA WASTEWATER TO A POTW

A discharge to a POTW must not occur if it will cause pass through, interference, violations of the specific prohibitions, or violations of the local limits or ordinance. POTWs under consideration as potential receptors of CERCLA wastewaters may include those POTWs either with or without an EPA-approved pretreatment program. POTWs with an approved pretreatment program are required to have the mechanisms necessary to ensure compliance by nondomestic users with applicable pretreatment standards and requirements.[25] These POTWs are also required to have the legal authority to deny or condition discharges that do not meet pretreatment standards and requirements. POTWs

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[25] POTWs with EPA-approved pretreatment programs must, among other things, establish procedures to notify nondomestic users of applicable pretreatment standards and requirements, receive and analyze self-monitoring reports from IUs, sample and analyze industrial effluents, require compliance, conduct inspections, investigate noncompliance, assess penalties, and comply with public participation requirements. A NPDES State may apply for approval of a State pretreatment program pursuant to 40 CFR §403.10(f). A State with an approved pretreatment program may assume responsibility for implementing a POTW pretreatment program in lieu of requiring the POTW to develop a pretreatment program.

without an approved pretreatment program must be evaluated to determine whether sufficient mechanisms (i.e., enforceable local limits) exist to allow the POTW to meet the requirements of the national pretreatment program in accepting CERCLA wastewaters. Pass through, interference and violations of the specific prohibitions are always prohibited regardless of whether a POTW has an approved pretreatment program.

The determination of a POTW's ability to accept CERCLA wastewater should be made during the remedial alternatives analysis under the Remedial Investigation Feasibility Study (RI/FS) process. Water Division officials and their State counterparts and representatives of the POTW should participate in the evaluation of any remedial alternatives recommending the use of a POTW. The following factors should be evaluated during the remedial alternatives analysis:

- The quantity and quality of the CERCLA wastewater and its compatibility with the POTW. The constituents in the CERCLA wastewater must not violate the specific prohibitions, cause pass through or interference, including unacceptable sludge contamination, or cause a hazard to employees at the POTW. In some cases, control equipment at the CERCLA site may be necessary in order to pretreat the CERCLA discharge prior to discharge to the POTW.[26]

- If an indirect discharge to a POTW is being considered as an alternative, RPMs should provide information, such as a description of the contents and concentrations in the wastewater, in order for the POTW to evaluate the impacts of a discharge on its treatment system and on its continued compliance with its NPDES permit. The RPM, working with the POTW, must perform the necessary analysis (e.g., pilot tests) to determine whether the CERCLA discharge is likely to cause interference or pass through at the POTW or to violate the specific prohibitions.

- 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. Section 121(d)(3) of CERCLA prohibits the

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[26] EPA's Office of Water is developing guidance manuals to assist in assessments regarding the compatibility of CERCLA wastewater with a POTW and the requirements necessary for CERCLA wastewater to comply with pretreatment standards. See also Guidance Manual for POTW Pretreatment Program Development, October, 1983 (includes discussion on developing local limits).

discharge of CERCLA wastes to facilities that are not in compliance with applicable Federal law.[27]

- The potential for volatilization of the wastewater constituents at the CERCLA site, while moving through the sewer system, or at the POTW and its impact upon air quality.

- The potential for ground-water contamination from transport of CERCLA wastewater or impoundment at the POTW, and the need for ground-water 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 State narrative standard of "no toxic materials 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.[28] Not all CERCLA wastewaters are considered hazardous wastes under RCRA (listed or characteristic); determinations must be made on a case-by-case basis.

  -- If the POTW is operating under an NPDES permit issued before November 8, 1984, the date of enactment of the Hazardous and Solid Waste Amendments (HSWA), which amended RCRA, the following permit-by-rule requirements under 40 CFR §270.60(c) apply: (1) the POTW must have an NPDES

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[27] If a POTW is operating under an expired permit, the conditions of the permit normally continue in force until the effective date of a new permit. Most NPDES permits provide for such extensions, unless this would violate State law. Thus, a CERCLA site could discharge to a POTW that has an expired permit, if the POTW has received an extension permissable under State law and is in compliance with the extended permit.

[28] The domestic sewage exclusion (DSE) under RCRA Subtitle C provides that nondomestic wastes are not considered hazardous wastes when they are discharged to sewers containing domestic sewage that is treated at a POTW. The POTW that accepts such wastes is not deemed to have received hazardous wastes and, therefore, is not subject to RCRA permit requirements.

permit; (2) the POTW must be in compliance with its NPDES permit; (3) the POTW must comply with RCRA regulations regarding requesting an identification number, using a manifest system, identifying manifest discrepancies, and complying with reporting requirements; and (4) the waste received meets all Federal, State, and local pretreatment requirements that would be applicable to the waste if it were discharged through a sewer, pipe, or similar conveyance (i.e., the same pretreatment standards as if the domestic sewage exclusion applied).

If the POTW is operating under an NPDES permit issued after November 8, 1984, including renewed permits, the POTW must comply with the same permit-by-rule requirements plus corrective action requirements under 40 CFR §264.101 before accepting a discharge of hazardous wastes.[29]

- The various costs of managing CERCLA wastewater, including all risks, liabilities, permit fees, etc.[30] 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, violations of the specific prohibitions, toxic pollutants in toxic amounts in the POTW's receiving waters, violations of water quality standards, unacceptable sludge contamination, or a hazard to employees of the POTW.

- The impact associated with transporting the waste to and/or discharging of CERCLA wastewater into a POTW

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[29] A RCRA rider permit incorporating the permit-by-rule requirements, including corrective action, will be issued in conjunction with renewal of the POTW's NPDES permit after November 8, 1984.

[30] SARA §119(c)(5)(D) specifically prohibits EPA from indemnifying an owner or operator of a facility regulated under the Solid Waste Disposal Act, therefore, POTWs subject to permit-by-rule provisions cannot be indemnified. EPA has extended this prohibition of indemnification to any POTW. (For more information, see OSWER Directive 9835.5.)

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.

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;

- Federal, State and local pretreatment requirements on the CERCLA discharge must be determined;

- All other requirements on the CERCLA discharge must be identified, e.g., manifesting requirements under RCRA if CERCLA wastewaters that are classified as hazardous wastes under RCRA are discharged directly to the POTW without prior mixing with domestic sewage, i.e., by truck, rail, or dedicated pipe; and

- The POTW's 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.

3.3.3 POTW CONTROL MECHANISMS

40 CFR §403.8(f)(iii) of the general pretreatment regulations require the use of control mechanisms (e.g., permit or order) to regulate indirect discharges to a POTW. These control mechanisms contain applicable pretreatment standards including local discharge prohibitions and numerical discharge limits.

The control mechanisms, in addition to incorporating pretreatment limitations and requirements, may also include the following:

- Monitoring and reporting requirements to ensure continued compliance with applicable pretreatment standards. Monitoring and reporting frequencies vary among POTWs. However, frequencies are typically based upon factors such as facility flow, types of pollutants expected, and process variability.

- Spill prevention programs to prevent the accidental discharge of pollutants to POTWs. The required components of a spill prevention program vary among POTWs. At a minimum, however, most POTWs require notification for spill events that could have an impact on their treatment system.

3.4 COMPLIANCE WITH DREDGE AND FILL REQUIREMENTS

3.4.1 DREDGE AND FILL ACTIVITIES

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 the site;
- Construction of berms and levees to contain wastes;
- Stream channelization;
- Excavation to contain effluent; and
- Dewatering of the site.

3.4.2 AUTHORITIES FOR REGULATING DREDGE AND FILL ACTIVITIES

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. Navigable waters of the U.S. are defined as waters that are subject to the ebb and flow of the tide shoreward to the mean high water mark and/or are presently used, or have been used in the past or may be susceptible to use to transport interstate or foreign commerce. Structures or work in, above, or under navigable waters are regulated under Section 10. Examples of activities include dredging, filling, installation of pilings, and construction of structures such as berms, levees, coffer dams, and piers.

- Section 404 of the Clean Water Act regulates the discharge of dredged or fill material to waters of the United States. Federal jurisdiction under Section 404, that is, waters of the U.S., is broader than that under Section 10 of the Rivers and Harbors Act and includes all waters of the U.S. including wetlands, the use of which could affect interstate commerce. Examples of the discharge of dredged or fill material regulated by Section 404 include (a) disposal of dredged material in wetlands, (b) capping, and (c) construction of berms and levees. It is important to note that while the act of excavation and/or dredging is not regulated under Section 404, the deposition of dredged or excavated materials in waters of the U.S. is a regulated activity under Section 404.

- Section 103 of the Marine Protection Research and Sanctuaries Act (MPRSA) regulates ocean discharges of materials dredged from waters of the U.S. Jurisdictional limits under Section 103 extend seaward from the low tide line (baseline of the territorial sea) where the shore directly contacts the open sea. Section 103 requires that permits be issued for the transport of dredged material for the purposes of dumping it into ocean waters. MPRSA §103(b) requires that ocean dumping of dredged material be at sites designated by EPA under MPRSA §102(c).

- 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, and to preserve and enhance the natural values of wetlands and floodplains. Federal actions include dredge and fill activities.

3.4.3 THE ARMY CORPS OF ENGINEERS/EPA PERMIT PROGRAM

The Army Corps of Engineers (the Corps) evaluates applications for permits for activities regulated under Section 10 of the Rivers and Harbors Act and Section 404 of the CWA.[31] Protection of wetlands and other aquatic habitats is one of the primary goals of the dredge and fill permit program. The Corps

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[31] A State agency may also be authorized to issue CWA §404 permits in lieu of the Corps for certain "State regulated waters." See 40 CFR Part 233.

issues or denies permit applications on the basis of compliance with relevant portions of the CWA §404(b)(1) guidelines and impact on the public interest (see next section). EPA also reviews Section 404 permit applications for compliance with the Guidelines as well as other CWA provisions.

Under CERCLA §121(e), CWA §404 permits are not required for dredge and fill activities conducted entirely on-site. However, the Corps' expertise in assessing the public interest factors for dredging and filling operations can contribute to the overall quality of the CERCLA response action.

MPRSA §103(c) requires the Corps of Engineers to notify EPA of its intention to issue Section 103 permits for ocean dumping of dredged materials. EPA reviews Section 103 permits for compliance with environmental criteria promulgated by EPA under Section 102(a) of MPRSA. The Corps cannot issue Section 103 permits that do not comply with Section 102(a) criteria unless EPA grants a waiver to do so.

3.4.4 SUBSTANTIVE REQUIREMENTS

3.4.4.1 Dredged and Fill Material Disposal Under CWA Section 404 and Rivers and Harbors Act Section 10[32]

Superfund's determination whether to discharge dredged or fill material in waters of the United States should be based primarily on application of the CWA §404(b)(1) guidelines, promulgated as regulations in 40 CFR §230.10. A guiding principle of Part 230 is that degradation or destruction of wetlands and other special aquatic sites should be avoided to the extent possible. Under the CWA §404(b)(1) guidelines, no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge that would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences (40 CFR §230.10(a)).

Pursuant to 40 CFR §230.10(b), no discharge of dredged or fill material shall be allowed if the discharge:

- Causes or contributes to violations of any additional State water quality standard;
- Violates any applicable toxic effluent standard or discharge prohibition under CWA §307;

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[32] Among the factors to-be-considered in determining disposal requirements for dredged materials in the Great Lakes Basin under Section 404 of the Clean Water Act are EPA Guidelines for the Pollutional Classifications of Great Lakes Harbor Sediments and International Joint Commission Average Concentrations.

- Jeopardizes endangered or threatened species specified under the Endangered Species Act of 1973 (See Volume 3 of compliance manual); or

- Violates requirements to protect any marine protection sanctuary designated under Title III of the Marine Protection, Research, and Sanctuaries Act of 1972.

The guidelines also provide that no discharge of dredged or fill material shall be permitted which will cause or contribute to significant degradation of the waters of the United States (40 CFR §230.10(c)). Where a discharge would significantly degrade the waters of the United States, and there are no practicable alternatives to the discharge, such degradation can often be avoided or reduced and compliance with the guidelines achieved through the use of appropriate and practicable mitigation measures to minimize potential adverse impacts of the discharge on the aquatic ecosystem (40 CFR §230.10(d)). The term "practicable" is defined in 40 CFR §230.3(q) to mean "available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes."

Determinations of Potential Effects of Discharge

Prior to selecting a remedy which involves the discharge of dredged or fill material, RPMs, working with the Regional 404/Wetlands Office, must consider the availability of practicable alternatives to discharges in wetlands and other special aquatic sites. If no practicable alternative exists, the potential short-term or long-term effects of the proposed discharge of dredged or fill material on the physical, chemical, and biological components of wetlands and the associated aquatic environment should be determined. 40 CFR §230.11 describes the types of effects of a proposed discharge that must be evaluated and considered in order to mitigate impacts, including:

- Physical substrate determinations;

- Water circulation, fluctuation, and salinity determinations;

- Suspended particulate/turbidity determinations;

- Contaminant determinations;

- Aquatic ecosystem and organism determinations;

- Proposed disposal site determinations;

- Determination of cumulative effects on the aquatic ecosystem; and

- o Determination of secondary effects on the aquatic ecosystem (see 40 CFR §§230.11 through 230.54).

Minimizing Adverse Impacts

Examples of specific steps that may be taken to comply with the requirement to minimize adverse impacts (40 CFR §230.10(d)) are set forth in considerable detail in 40 CFR Part 230, Subpart H, entitled "Actions to Minimize Adverse Effect." The most preferred type of mitigation is to avoid impacts entirely. In some cases, avoidance is not possible. In such cases, the goal of mitigation for unavoidable impacts is to minimize adverse effects. This may include project modifications such as modification of the choice of disposal site, treatment of material to be disposed, providing for control of the material after discharge, or, when necessary and practicable, wetland enhancement, wetland restoration, and in certain instances, wetland creation (40 CFR §230.75(d), where demonstrated effective techniques are available. Small scale use of such techniques should be used where proposed development and restoration techniques have not yet advanced to the pilot demonstration stage. What constitutes necessary mitigation at a particular site is a case-specific determination depending on such factors as the type of activity, the type of wetland, how well the wetland is presently functioning, etc., always keeping in mind the goal of preserving wetland values at the site.

ARAR Determination

Section 404 applies to the discharger of dredged and fill materials and addresses the impacts caused by such discharges. In some CERCLA response actions, the wetland will already be severely degraded by virtue of prior discharges of waste. While part of the CERCLA remedy may be to fill in the wetland, the remedy would contemplate that the fill will serve an environmental benefit. Where the functioning of the wetland has already been significantly and irreparably degraded, mitigation would be oriented towards minimizing further adverse environmental impacts, rather than attempting to recreate the wetland's original value on-site or off-site. That is, there would be discretion, but no obligation under CWA §404 for the lead agency to mitigate those impacts that preceded the remedial fill operation. While CWA §404 is not an applicable requirement in such cases, mitigation, including wetland restoration and creation, may nonetheless be appropriate in some circumstances to protect the environmental values of the site. Moreover, other provisions, most notably 40 CFR Part 6, Appendix A, implementing Executive Orders 11988 and 11990 (see section 3.4.4.3 below), may require such mitigation. In addition, independent enforcement authorities under the Clean Water Act (§§309 and 404) may be used to require private parties responsible for the original discharge (e.g., the contamination) to conduct appropriate mitigation activities.

In contrast, there will be other situations where the response action itself involves a discharge that may destroy an undegraded, functioning wetland. Examples includes the diversion of surface or ground water through an existing

wetland, and building access roads in wetlands. Such activities should be avoided to the extent practicable. For impacts that cannot be avoided or minimized as described above, enhancement, restoration, or creation of another wetland, as provided in the CWA §404(b)(1) guidelines, may be applicable or relevant and appropriate to Superfund actions.

A discharge must comply with the CWA §404(b)(1) guidelines. If the discharge complies with the guidelines, RPMs shall then consider whether the discharge would be in the public interest. This includes evaluation of the probable impacts, including cumulative impacts, of the proposed activity on the public interest. This evaluation requires a careful weighing of all those factors that become relevant in each particular case.[33] The public interest review factors may not be used to offset noncompliance with the guidelines. While a discharge that meets the guidelines may not be permitted if it is concluded that permit issuance is not in the public interest, the regulations do not allow a determination that it is in the public interest to issue a permit that does not comply with the guidelines.

In selecting remedies, the RPMs should also consult with the State(s) in which the waters of the United States to be filled are located. Under CWA §401 no permit may be used until the State concurs or waives concurrence. Certification primarily focuses on whether the State believes its water quality standards will be violated if the discharge occurs; the State, for example, may condition its concurrence on the inclusion of additional requirements necessary to satisfy State law. More specific guidance appears in CWA §401(a) and (d) and 40 CFR Part 121.

Since no permit is required in the case of on-site actions, State certification is not legally required. However, consultation with the State should occur in general as part of State identification of substantive State ARARS. If a State determines the discharge would violate the requirements of CWA §401(a)(1), a discharge of dredged or fill material does not comply with the CWA §404(b)(1) guidelines (40 CFR 230.10). In such circumstances, the discharge will occur only in accordance with CERCLA waiver criteria for ARARs. In addition, the State will have the opportunity to review and concur with the remedy selected in the Record of Decision.

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[33] 33 CFR §325.3(c) sets forth the following factors that the Corps should evaluate when conducting a public interest analysis: conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, flood hazards, land use, navigation, shoreline erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, considerations of property ownership and, in general, the needs and welfare of the people.

3.4.4.2 Dredged Material Disposal under Section 103, MPRSA

Consistent with EPA's regulations under 40 CFR §225.2, Superfund's decision to ocean dispose (seaward of the territorial sea baseline) of dredged material (generally an off-site activity) needs to consider the following requirements:

- Disposal must be at a site designated by EPA for such use unless disposal at an available, designated site is not feasible;
- Requests for disposal at a nondesignated site must be accompanied by a statement of the basis for the determination that disposal at a designated site is not feasible.

Requests for ocean disposal of dredged materials under Section 103 of MPRSA must include the following information:

- Historical uses of the proposed disposal site;
- Documented effects of other current or historical disposal activities, if any, in the area of the proposed dredged material site;
- Estimated length of time for the proposed dredged material disposal;
- Characteristics, quantities, and composition of the dredged material; and
- A description of the proposed disposal site characteristics (if it is not a designated site) necessary for designation under 40 CFR Part 228.

Requests for ocean disposal of dredged material will be reviewed by the Corps of Engineers (the permit issuing agency) for compliance with EPA's criteria under 40 CFR Part 227, including the following:

- Environmental impact criteria;
- Determination of the need for ocean disposal of dredged materials, including the evaluation of other available disposal alternatives;
- Impact on aesthetic, recreational, and economic values;
- Impact on other uses of the ocean.

3.4.4.3 Dredged and Fill Material Disposal Under 40 CFR Part 6, Appendix A

40 CFR Part 6, Appendix A, which describes EPA's policy on implementing Executive Orders 11988 (Floodplain Management) and 11990 (Wetlands Protection), may be applicable or relevant and appropriate for CERCLA activities.[34] The procedures substantively require that EPA conduct its activities to avoid, to the extent possible, the long- and short-term adverse impacts associated with the destruction or modification of wetlands and the occupation or modification of floodplains. The procedures also require EPA to avoid direct or indirect support of new construction in wetlands or floodplain development wherever there are practicable alternatives and to minimize potential harm to floodplains or wetlands when there are no practicable alternatives.

3.4.5 COORDINATION BETWEEN SUPERFUND AND THE 404/WETLANDS PROTECTION PROGRAM OFFICES OR OCEAN DISPOSAL PROGRAM

RPMs should early and continuously involve the affected Regional 404/ Wetlands Protection office or Ocean Disposal Program where discharge of dredged or fill material is being considered as a component of a remedy (see section 3.2.4 generally describing coordination procedures), or if the CERCLA action has the potential to affect wetlands.[35] If additional expertise is required and can be obtained within time constraints of the response action, the 404 office or Ocean Disposal Program, acting as a liaison and working closely with the lead agency Remedial Project Manager, should consult with other agencies with expertise in dredge and fill-type determinations: the Corps of Engineers (general expertise in conducting public interest and Section 404(b)(1) guidelines analyses and in identifying wetland resources), the Fish and Wildlife Service (identifying endangered species, evaluating impacts to the fish and wildlife community), the National Marine Fisheries Service (evaluating impacts to commercial and sport fisheries), the National Oceanic and Atmospheric Administration, and appropriate State agencies.

Advice from the 404/Wetlands Office or Ocean Disposal Program and these other agencies may assist the lead agency responsible for CERCLA site cleanup in evaluating the possible impact of proposed actions on the aquatic environment, and in selecting the best overall remedy through a careful weighing of all relevant factors. These offices may also advise RPMs on how to minimize and mitigate adverse environmental impacts.

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[34] 40 CFR Part 6, Subpart A sets forth EPA policy for carrying out the provisions of Executive Orders 11988 (Floodplains Management) and 11990 (Protection of Wetlands).

[35] In Regions 3, 6 and 7, the 404/Wetlands Protection Program Offices are not located in the Water Office. In Regions 3 and 6, the wetlands program is located in the Environmental Services Division and in Region 7 is located under the Assistant Regional Administrator for Policy and Management.

EXHIBIT 3-1

CLEAN WATER ACT EFFLUENT GUIDELINES DEVELOPMENT DOCUMENTS 1/

INDUSTRIAL POINT SOURCE CATEGORY	40 CFR PART NUMBER	SUBCATEGORY	EPA PUBLICATION DOCUMENT NUMBER	SOURCES OF AVAILABILITY: NTIS ACCESSION NUMBER	SOURCES OF AVAILABILITY: GPO STOCK NUMBER	SOURCES OF AVAILABILITY: EPA
ALCOHOL FOR FUEL (SYNFUELS)	472	- Multimedia Technical Support Document for Ethanol and Fuel Industry	EPA 440/1-86/093	PB86/177557/AS	----------	
		- Low BTU Gasifier Wastewater (1986)	----------	PB86/245438/AS	----------	
		- Ethanol-for-fuel (Guidance)	EPA 440/1-86/093	----------	----------	X
		- Low BTU Coal Gasification (Guidance)	EPA 440/1-86/093	----------	----------	X
ALUMINUM FORMING	467	- Aluminum Forming Volumes I & II (Final)	EPA 440/1-84/073 Vol. I Vol. II	PB84-244425 PB84-244433	---------- ----------	 X
ASBESTOS MANUFACTURING	427	- Building, Construction and Paper (Final)	EPA 4401/ 1-74/017-a	PB236320/6	5501-00827	
		- Textile, Friction Materials and Sealing (Final)	EPA 440/1-74/035-a	PB240860/7	----------	

1/ The development documents provide a detailed technical basis for the categorical effluent limitations (direct and indirect charges) promulgated for each industrial category. The documents may be useful in determining BAT/BCT technology to discharges from CERCLA sites, but are not in themselves ARARs.

EXHIBIT 3-1 (Continued)

CLEAN WATER ACT EFFLUENT GUIDELINES DEVELOPMENT DOCUMENTS 1/

INDUSTRIAL POINT SOURCE CATEGORY	40 CFR PART NUMBER	SUBCATEGORY	EPA PUBLICATION DOCUMENT NUMBER	SOURCES OF AVAILABILITY: NTIS ACCESSION NUMBER	GPO STOCK NUMBER	EPA
BATTERY MANUFACTURING	461	- Battery Manufacturing (Proposed)	EPA 440/1-82/067-b	PB83-197921	----------	X
						X
		- Erratta Sheet				
		- Battery Manufacturing (Final)	EPA 440/1-84/067 Vol. I	PB85-121507	----------	X
			Vol. II	PB85-121515	----------	X
BUILDERS PAPER AND BOARD MILLS	431	- Builders Paper & Roofing	EPA 440/1-74/026-a	PB238076/4	5501-00909	X
Also part 430		- Board & Builders Paper and Board Mills (Proposed)	EPA 440/1-80/025-b	PB81-201535	----------	
		- Pulp, Paper and Paperboard and Builders' Paper & Board Mills (Final)	EPA 440/1-82/025	PB83-163949	----------	
CANNED & PRESERVED FRUITS & VEGETABLES	407	- Citrus, Apple & Potatoes	EPA 440/1-74/027-a	PB238649/8	5501-00790	X

EXHIBIT 3-1 (Continued)

CLEAN WATER ACT EFFLUENT GUIDELINES DEVELOPMENT DOCUMENTS 1/

INDUSTRIAL POINT SOURCE CATEGORY	40 CFR PART NUMBER	SUBCATEGORY	EPA PUBLICATION DOCUMENT NUMBER	SOURCES OF AVAILABILITY: NTIS ACCESSION NUMBER	SOURCES OF AVAILABILITY: GPO STOCK NUMBER	SOURCES OF AVAILABILITY: EPA
CANNED AND PRESERVED SEAFOOD PROCESSING	408	- Catfish, Crab, Shrimp	EPA 440/1-74/020-a	PB230614/2	5501-00920	
		- Fishmeal, Salmon, Bottom Fish, Sardine, Herring, Clam, Oyster, Scallop, & Abalone (Final)	EPA 440/1-75/041-a	PB256840/0	----------	X
		- Report to Congress, Section 74 Seafood Processing Executive Summary - (Vol. I-III)	EPA 440/1-80/020	PB81-182354	----------	
CEMENT MANUFACTURING	411	- Cement Manufacturing	EPA 440/1-74/005-a	PB238610/0	5501-00866	

EXHIBIT 3-1 (Continued)

CLEAN WATER ACT EFFLUENT GUIDELINES DEVELOPMENT DOCUMENTS 1/

INDUSTRIAL POINT SOURCE CATEGORY	40 CFR PART NUMBER	SUBCATEGORY	EPA PUBLICATION DOCUMENT NUMBER	SOURCES OF AVAILABILITY: NTIS ACCESSION NUMBER	SOURCES OF AVAILABILITY: GPO STOCK NUMBER	SOURCES OF AVAILABILITY: EPA
COIL COATING	465	- Coil Coating Phase I (Final)	EPA 440/1-82/071	PB83-205542	----------	X
		- Coil Coating (Phase II Canmaking)- (Proposed)	EPA 440/1-83/071-b	PB83-198598		X
		- Coil Coating Canmaking Phase II (Final)	EPA 440/1-83/071	PB84-198647	----------	X
COAL MINING	434	- Coal Mining (Proposed)	EPA 440/1-81/057-b	PB81-229296	----------	
		- Coal Mining (Final)	EPA 440/1-82/057	PB83/180422	----------	
COOLING WATER INTAKE STRUCTURES	402	- Best Technology Available for the Location Design Construction & Capacity of Cooling Water Intake Structures for Minimizing Adverse Environmental Impact	EPA 440/1-76/015-a	PB-253573/0	----------	

EXHIBIT 3-1 (Continued)

CLEAN WATER ACT EFFLUENT GUIDELINES DEVELOPMENT DOCUMENTS 1/

INDUSTRIAL POINT SOURCE CATEGORY	40 CFR PART NUMBER	SUBCATEGORY	EPA PUBLICATION DOCUMENT NUMBER	SOURCES OF AVAILABILITY: NTIS ACCESSION NUMBER	SOURCES OF AVAILABILITY: GPO STOCK NUMBER	SOURCES OF AVAILABILITY: EPA
COPPER FORMING	468	- Copper and Copper Products (Draft)	EPA 440/1-80/073-a	----------	----------	X
		- Copper (Final)	EPA 440/1-84/074	PB84-192459	----------	X
DAIRY PRODUCTS PROCESSING	405	- Dairy Products Processing	EPA 440/1-74/021-a	PB238835/3	5501-00898	
DOMESTIC SEWAGE STUDY - HAZARDOUS WASTES	----------	- Report to Congress on the Discharge of Hazardous Wastes to Publicly Owned Treatment works.	EPA 530-SW-86-004	PB86/184017/AS	----------	
ELECTRICAL AND ELECTRONIC COMPONENTS	469	- Electrical and Electronic	EPA 440/1-82/075-b	PB82-249673	----------	
		- Electrical and Electronic Components Phase II (Proposed)	EPA 440/1-83/075-b	PB83-190208		

EXHIBIT 3-1 (Continued)

CLEAN WATER ACT EFFLUENT GUIDELINES DEVELOPMENT DOCUMENTS 1/

INDUSTRIAL POINT SOURCE CATEGORY	40 CFR PART NUMBER	SUBCATEGORY	EPA PUBLICATION DOCUMENT NUMBER	SOURCES OF AVAILABILITY: NTIS ACCESSION NUMBER	SOURCES OF AVAILABILITY: GPO STOCK NUMBER	SOURCES OF AVAILABILITY: EPA
ELECTROPLATING & METAL FINISHING	413 & 433	- Copper, Nickel, Chrome, & Zinc (Final)	EPA 440/1-74/003-a	PB238834/AS	5501-00816	
		- Electroplating - Pretreatment (Final)	EPA 440/1-79/003	PB80-196488	----------	
		- Metal Finishing (Proposed)	EPA 440/1-82/091-b	PB83-102004	----------	X
		- Metal Finishing (Final)	EPA 440/1-83/091	PB84-115989	----------	
		- Guidance Manual for Electroplating and Metal Finishing Pretreatment Standards (February 1984)	EPA 440/1-84/091g	----------	----------	
FEEDLOTS	412	- Feedlots (Final)	EPA 440/1-74/004-a	PB23851/AS	5501-00842	
FERROALLOY	424	- Smelting and Slag Processing	EPA 440/1-74/008-a	PB238650/AS	5501-00780	

EXHIBIT 3-1 (Continued)

CLEAN WATER ACT EFFLUENT GUIDELINES DEVELOPMENT DOCUMENTS 1/

INDUSTRIAL POINT SOURCE CATEGORY	40 CFR PART NUMBER	SUBCATEGORY	EPA PUBLICATION DOCUMENT NUMBER	SOURCES OF AVAILABILITY: NTIS ACCESSION NUMBER	SOURCES OF AVAILABILITY: GPO STOCK NUMBER	SOURCES OF AVAILABILITY: EPA
FERTILIZER MANUFACTURING	418	- Basic Fertilizer Chemicals	EPA 440/1-74/011-a	PB238652/AS	5501-00868	
		- Formulated Fertilizer (Final)	EPA 440/1-75/042-a	PB240863/AS	5501-01006	
GLASS MANUFACTURING	426	- Pressed & Blown Glass (Final)	EPA 440/1-75/034-a	PB256854/1	5501-01036	
		- Insulation Fiberglass (Final)	EPA 440/1-74/001-b	PB238078/0	5501-00781	
		- Flat Glass (Final)	EPA 440/1-74/001-c	PB238-907/0	5501-00814	X
GRAIN MILLS	406	- Grain Processing	EPA 440/1-74/028-a	PB238316/4	5501-00844	
		- Animal Feed, Breakfast Cereal & Wheat	EPA 440/1-74/039-a	PB240861/5	5501-01007	

EXHIBIT 3-1 (Continued)

CLEAN WATER ACT EFFLUENT GUIDELINES DEVELOPMENT DOCUMENTS 1/

INDUSTRIAL POINT SOURCE CATEGORY	40 CFR PART NUMBER	SUBCATEGORY	EPA PUBLICATION DOCUMENT NUMBER	SOURCES OF AVAILABILITY: NTIS ACCESSION NUMBER	SOURCES OF AVAILABILITY: GPO STOCK NUMBER	SOURCES OF AVAILABILITY: EPA
INORGANIC CHEMICALS MANUFACTURING	415	- Major Inorganic Chemical Products	EPA 440/1-74/007-a	PB238611/8	5502-00121	
		- Inorganic Chemicals Manufacturing (Proposed Phase II)	EPA 440/1-80/007-b	PB81-122632	----------	X
		- Inorganic Chemicals (Treatability Study)	EPA 440/1-80/103	----------	----------	X
		- Inorganic Chemicals (Final Phase II)	EPA 440/1-82/007	PB82-265612	----------	
		- Inorganic Chemicals (Final Phase II)	EPA 440/1-84/007	PB85-156446/XAB	----------	X

EXHIBIT 3-1 (Continued)

CLEAN WATER ACT EFFLUENT GUIDELINES DEVELOPMENT DOCUMENTS 1/

INDUSTRIAL POINT SOURCE CATEGORY	40 CFR PART NUMBER	SUBCATEGORY	EPA PUBLICATION DOCUMENT NUMBER	SOURCES OF AVAILABILITY: NTIS ACCESSION NUMBER	SOURCES OF AVAILABILITY: GPO STOCK NUMBER	SOURCES OF AVAILABILITY: EPA
IRON & STEEL MANUFACTURING	420	- Steel Making	EPA 440/1-74/024-a	PB23883/9	5501-00906	
		- Iron & Steel (Proposed)	EPA 440/1-80/024-D	PB81-184384	----------	
		Volume I	"	PB81-184392		
		Volume II	"	PB81-184400		
		Volume III	"	PB81-184418		
		Volume IV	"	PB81-184426		
		Volume V	"	PB81-184434		
		Volume VI	"	PB81-184442		
		- Iron & Steel (Final)	EPA 440/1-82/024	Set of Vol's I thru VI		
		Volume I	"	PB82-240425-a	----------	
		Volume II	"	PB82-240433-b		
		Volume III	"	PB82-240441-c		
		Volume IV	"	PB82-240458-d		
		Volume V	"	PB82-240466-e		
		Volume VI	"	PB82-240474-f		
		- Guidance Manual for Pretreatment Standards (September 1985)				

EXHIBIT 3-1 (Continued)

CLEAN WATER ACT EFFLUENT GUIDELINES DEVELOPMENT DOCUMENTS 1/

INDUSTRIAL POINT SOURCE CATEGORY	40 CFR PART NUMBER	SUBCATEGORY	EPA PUBLICATION DOCUMENT NUMBER	SOURCES OF AVAILABILITY: NTIS ACCESSION NUMBER	SOURCES OF AVAILABILITY: GPO STOCK NUMBER	SOURCES OF AVAILABILITY: EPA
LEATHER TANNING	425	- Leather Tanning	EPA 440/1-74/016-a	PB238079/8	5501-00818	
		- Pretreatment Public Hearing Transcript for Leather Tanning and Finishing (February 15, 1980)	----------	----------	----------	
		- Leather Tanning (Final)	EPA 440/1-82/016	PB83-1/2593	----------	X
MEAT PRODUCTS AND ENGINEERING	432	- Red Meat Processing (Final)	EPA 440/1-74/012-a	PB238076/AS	5501-00843	
		- Renderer (Final)	EPA 440/1-74/031-d	PB253572/2	----------	
METAL FINISHING	433	- Metal Finishing (Proposed)	EPA 440/1-82/091-b	PB83-102004	----------	
		- Metal Finishing (Final)	EPA 440/1-83/091	PB84-115989		X
- also refer to Part 413		- Guidance Manual for Electroplating and Metal Finishing Pretreatment Standards (February 1984)	----------	----------	----------	

EXHIBIT 3-1 (Continued)

CLEAN WATER ACT EFFLUENT GUIDELINES DEVELOPMENT DOCUMENTS 1/

INDUSTRIAL POINT SOURCE CATEGORY	40 CFR PART NUMBER	SUBCATEGORY	EPA PUBLICATION DOCUMENT NUMBER	SOURCES OF AVAILABILITY: NTIS ACCESSION NUMBER	SOURCES OF AVAILABILITY: GPO STOCK NUMBER	SOURCES OF AVAILABILITY: EPA
METAL MOLDING AND CASTING (FOUNDRIES)	464	- Metal Molding and Casting (Vol. I & II) (Proposed)	EPA 440/1-82/070-b Vol. 1 Vol. 2	----------	----------	X
		- Metal Molding & Casting (Foundries) (Final)	EPA 440/1-85/070	PB86-161452/AS	----------	
MINERAL MINING & PROCESSING	436	- Minerals for the Construction Industry	EPA 440/1-75/059	PB 274593/3	----------	
NONFERROUS METALS FORMING	471	- Nonferrous Metals Forming (Final)	EPA 440/1-84/019-b Vol. I Vol. II Vol. III	----------	----------	X X X
NONFERROUS METALS MANUFACTURING	421	- Bauxite Refining - Aluminum Segment	EPA 440/1-74/091-c	PB238463/4	5501-00116	
		- Primary Aluminum Smelting - Aluminum Segment	EPA 440/1-74/019-d	PB240859/9	5501-00817	
		- Secondary Aluminum Smelting- Aluminum Segment	EPA 440/1-74/019-e	PB238464/2	5501-00819	

EXHIBIT 3-1 (Continued)

CLEAN WATER ACT EFFLUENT GUIDELINES DEVELOPMENT DOCUMENTS 1/

INDUSTRIAL POINT SOURCE CATEGORY	40 CFR PART NUMBER	SUBCATEGORY	EPA PUBLICATION DOCUMENT NUMBER	SOURCES OF AVAILABILITY: NTIS ACCESSION NUMBER	SOURCES OF AVAILABILITY: GPO STOCK NUMBER	SOURCES OF AVAILABILITY: EPA
OIL & GAS EXTRACTION	435	- Onshore (Interim Final) (Includes Offshore)	EPA 440/1-76/055-a	----------	----------	
		- Oil & Gas Extraction (Proposed)	EPA 440/1-85/055	PB86-114949/XAB	----------	
		- Assessment of Environmental Fate & Effects of Discharge from Offshore Oil and Gas Operations	EPA 440/4-85/002	PB86/114964/AS	----------	
ORE MINING AND DRESSING	440	- Ore Mining and Dressing Volume I	EPA 440/1-78/061-d	PB286520/AS	----------	
		- Ore Mining and Dressing Volume II	EPA 440/1-78/061-e	PB286521/AS	----------	
		- Ore Mining & Dressing (Proposed)	EPA 440/1-82/061-b	PB82-250952	----------	X
		- Ore Mining & Dressing (Final)	EPA 440/1-82/061	----------	----------	X

EXHIBIT 3-1 (Continued)

CLEAN WATER ACT EFFLUENT GUIDELINES DEVELOPMENT DOCUMENTS 1/

INDUSTRIAL POINT SOURCE CATEGORY	40 CFR PART NUMBER	SUBCATEGORY	EPA PUBLICATION DOCUMENT NUMBER	SOURCES OF AVAILABILITY: NTIS ACCESSION NUMBER	SOURCES OF AVAILABILITY: GPO STOCK NUMBER	SOURCES OF AVAILABILITY: EPA
ORGANIC CHEMICALS MANUFACTURING & PLASTICS AND SYNTHETIC FIBERS	414 and 416	- Major Organic Products	EPA 440/1-74/009-a	PB241905/9	5001-008812	
		- Organic Chemicals & Plastics & Synthetic Fibers (Proposed)	EPA 440/1-83/009-b Vol. I Vol. II Vol. III	PB83-205625 PB83-205633 PB83-205641 PB83-205658 - Set to Vol's I and III	----------	
		- Selected Summary of Information in Support of Oorganic Chemicals, Plastic & Synthetic Fibers (July 1985)				X
		- Guidance Manual for Implementing Total Toxic Organic (TTO) Pretreatment Standards (September 1985)				X

EXHIBIT 3-1 (Continued)

CLEAN WATER ACT EFFLUENT GUIDELINES DEVELOPMENT DOCUMENTS 1/

INDUSTRIAL POINT SOURCE CATEGORY	40 CFR PART NUMBER	SUBCATEGORY	EPA PUBLICATION DOCUMENT NUMBER	SOURCES OF AVAILABILITY: NTIS ACCESSION NUMBER	SOURCES OF AVAILABILITY: GPO STOCK NUMBER	SOURCES OF AVAILABILITY: EPA
PESTICIDES	455	- Pesticides	EPA 440/1-78/060-e	PB285480/0	----------	
		- Pesticides (Proposed)	EPA 440/1-82/079-b	PB83-15371		
		- Test Methods for Non-conventional Pesticides Chemical Analysis of Industrial & Municipal wastewater	EPA 440/1-82/079-c	PB83-176636	----------	
		- Pesticides (Final)	EPA 440/1-85/079	PB86-150042/XAB	----------	
PETROLEUM REFINING	419	- Petroleum Refining	EPA 440/1-74/014-a	PB238612/6	5501-00912	
		- Petroleum Refining (Proposed)	EPA 440/1-79/014-b	PB81-118413	----------	
		- Petroleum Refining (Final)	EPA 440/1-82/014	PB83-1/2569	----------	
		- Transcript for Public Hearing for Petroleum Refining (April 9, 1980)	----------	----------	----------	

EXHIBIT 3-1 (Continued)

CLEAN WATER ACT EFFLUENT GUIDELINES DEVELOPMENT DOCUMENTS 1/

INDUSTRIAL POINT SOURCE CATEGORY	40 CFR PART NUMBER	SUBCATEGORY	EPA PUBLICATION DOCUMENT NUMBER	SOURCES OF AVAILABILITY: NTIS ACCESSION NUMBER	SOURCES OF AVAILABILITY: GPO STOCK NUMBER	SOURCES OF AVAILABILITY: EPA
PHARMACEUTICALS	439	- Pharmaceutical (Proposed)	EPA 440/1-82/084-b	----------	----------	X
		- Pharmaceutical (Final)	EPA 440/1-83/084	PB84-180066	----------	X
PHOSPHATE MANUFACTURING	422	- Phosphorus Derived Chemicals	EPA 440/1-74/006-a	PB241018/1	5503-00078	
		- Other Non-Fertilizer Chemicals	EPA 440/1-75/043	----------	----------	X

EXHIBIT 3-1 (Continued)

CLEAN WATER ACT EFFLUENT GUIDELINES DEVELOPMENT DOCUMENTS 1/

INDUSTRIAL POINT SOURCE CATEGORY	40 CFR PART NUMBER	SUBCATEGORY	EPA PUBLICATION DOCUMENT NUMBER	SOURCES OF AVAILABILITY: NTIS ACCESSION NUMBER	SOURCES OF AVAILABILITY: GPO STOCK NUMBER	SOURCES OF AVAILABILITY: EPA
PLASTIC & SYNTHETIC FIBERS (MATERIALS) & ORGANIC CHEMICALS MANUFACTURING	416 & 414	- Synthetic Resins	EPA 440/1-74/010	PB2-39241/3	5501-00815	
		- Synthetic Polymers	EPA 440/1-74/036	PB240862/3	5501-01012	X
		- Organic Chemicals & Plastics & Synthetic Fibers (Proposed)	EPA 440/1-83/009-b Vol. I Vol. II Vol. III	PB83-205625 PB83-205633 PB83-205641 PB83-205658 Set of Vol's I thru III	----------	
		- Selected Summary or Information in Support of Organic Chemicals, Plastic & Synthetic Fibers (July 1985)	----------	----------	----------	X
		- Guidance Manual for Implementing Total Toxic Organic (TTO) Pretreatment Standards (September 1985)	----------	----------	----------	
PORCELAIN ENAMELING	466	- Porcelain Enameling (Proposed)	EPA 440/1-81/072-b	PB81-201527	----------	X
		- Porcelain Enameling (Final)	EPA 440/1-82/072	----------	----------	X

EXHIBIT 3-1 (Continued)

CLEAN WATER ACT EFFLUENT GUIDELINES DEVELOPMENT DOCUMENTS 1/

INDUSTRIAL POINT SOURCE CATEGORY	40 CFR PART NUMBER	SUBCATEGORY	EPA PUBLICATION DOCUMENT NUMBER	SOURCES OF AVAILABILITY: NTIS ACCESSION NUMBER	SOURCES OF AVAILABILITY: GPO STOCK NUMBER	SOURCES OF AVAILABILITY: EPA
POTWs/POLLUTANTS:-- Priority Pollutants in Publicly Owned Treatment Works	----------	Fate of Priority Pollutants in Publicly Owned Treatment Works (Vol. I & II)	EPA 440/1-82/303 Vol. I Vol. II	PB83-122788 PB83-122796	---------- ----------	

EXHIBIT 3-1 (Continued)

CLEAN WATER ACT EFFLUENT GUIDELINES DEVELOPMENT DOCUMENTS 1/

INDUSTRIAL POINT SOURCE CATEGORY	40 CFR PART NUMBER	SUBCATEGORY	EPA PUBLICATION DOCUMENT NUMBER	SOURCES OF AVAILABILITY: NTIS ACCESSION NUMBER	SOURCES OF AVAILABILITY: GPO STOCK NUMBER	SOURCES OF AVAILABILITY: EPA
PULP, PAPER AND PAPERBOARD	430	- Unbleached Kraft and Semi-chemical Pulp	EPA 440/1-74/025-a	PB238833/AS	----------	
		- Pulp & Paper and Paperboard and Builders' Paper and Board Mills (Proposed)	EPA 440/1-80/025-b	PB81-201535	----------	X
		- Pulp, Paper & Paperboard and Builders' Paper & Board Mills (Final)	EPA 440/1-82/025	PB83-163949	----------	X
		- Control of Polychlorinated Biphenyls in the Deink Subcategory of Pulp, Paper & Paperboard (Oct. 1982)	----------	----------	----------	
RUBBER PROCESSING	428	- Tire & Synthetic	EPA 440/1-74/013-a	PB238609/2	5501-00885	
		- Fabricated & Reclaimed Rubber (Final)	EPA 440/1-74/030-a	PB241916/6	5501-01016	

EXHIBIT 3-1 (Continued)

CLEAN WATER ACT EFFLUENT GUIDELINES DEVELOPMENT DOCUMENTS 1/

INDUSTRIAL POINT SOURCE CATEGORY	40 CFR PART NUMBER	SUBCATEGORY	EPA PUBLICATION DOCUMENT NUMBER	SOURCES OF AVAILABILITY: NTIS ACCESSION NUMBER	SOURCES OF AVAILABILITY: GPO STOCK NUMBER	SOURCES OF AVAILABILITY: EPA
SOAPS & DETERGENTS	417	- Soaps & Detergents	EPA 440/1-74/018-a	PB238613/4	5501-00867	
STEAM ELECTRIC POWERPLANTS	421	- Steam Electric Power Generating	EPA 440/1-74/029-a	PB240853/2	5501-01001	
		- Steam Electric (Proposed)	EPA 440/1-80/029-b	PB81-19075	----------	
SUGAR PROCESSING	409	- Beet Sugar (Final)	EPA 440/1-74/002-D	PB238462/6	5501-0011/	
		- Cane Sugar Refining (Interim Final)	EPA 440/1-74/002-c	PB23814/3	5501/00826	
TEXTILE MILLS MANUFACTURING	410	- Textile Mills	EPA 440/1-74/022-a	PB238832/AS	5501-00903	
		- Textile Mills (Final)	EPA 440/1-82/022	PB83-1168/1	----------	
TIMBER PRODUCTS PROCESSING	429	- Wood Furniture and Fixtures	EPA 440/1-74/033-a	----------	----------	X
		- Timber Products Processing (Proposed)	EPA 440/1-79/023-b	----------	----------	X
		- Timber Products Processing (Final)	EPA 440/1-81/023	PB81-227282	----------	

CHAPTER 4

GUIDANCE FOR COMPLIANCE WITH REQUIREMENTS OF THE SAFE DRINKING WATER ACT

4.0 INTRODUCTION

This chapter addresses CERCLA compliance with Safe Drinking Water Act (SDWA) applicable or relevant and appropriate requirements (ARARs) in remedial actions.[1] It is organized into two sections:

- Section 4.1 provides a general overview of the provisions of the SDWA and how they are implemented; and
- Section 4.2 presents a summary of SDWA ARARs for CERCLA actions including drinking water standards, underground injection control, sole source aquifer, and wellhead protection program requirements.

4.1 OVERVIEW OF THE SAFE DRINKING WATER ACT

The Safe Drinking Water Act (SDWA),[2] initially enacted in 1974 and most recently amended in 1986, mandates EPA to establish regulations to protect human health from contaminants in drinking water. The legislation authorizes national drinking water standards and a joint Federal-State system for assuring compliance with those standards. Maximum contaminant levels and treatment techniques ensure the quality of public drinking water supplies. This section provides an overview of the treatment and pollution prevention requirements imposed by the SDWA that may potentially affect the selection, design, and implementation of CERCLA response activities.

The establishment of national drinking water standards is authorized under Title XIV, Part B of the SDWA. EPA has developed two sets of drinking water standards, referred to as primary and secondary standards, to protect human health and ensure the aesthetic quality of drinking water respectively. Primary standards consist of contaminant-specific standards, known as Maximum Contaminant Levels (MCLs). MCLs are set as close as feasible to Maximum Contaminant Level Goals (MCLGs), which are purely health-based goals. Secondary

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[1] The requirements of CERCLA §121 generally apply as a matter of law only to remedial actions. However, as a matter of policy, EPA will attain ARARs to the greatest extent practicable considering the exigencies of the situation at the site when carrying out removal actions.

[2] 42 USC §300f, et seq., as amended (in 1976, 1977, 1979, 1980, 1984, and 1986).

drinking water standards consist primarily of limits used by States to regulate the aesthetic quality of water supplies, and are not enforceable at the Federal level.

Part C of Title XIV of the SDWA authorizes the establishment of a permit program and two resource planning programs designed to prevent contamination of underground sources of drinking water. Those three programs are: the Underground Injection Control (UIC) permit program, the Sole Source Aquifer program, and the Wellhead Protection program.

Owners and operators of certain classes of underground injection wells must obtain permits or be authorized by rule under the UIC program in order to operate the wells. The permit applicant must prove to the State or Federal permitting authority that the underground injection will not endanger drinking water sources.

An aquifer that is identified as the sole or principal source of drinking water source for an area may be designated as a "sole source aquifer" under Section 1424(e) of the SDWA. No commitment of Federal financial assistance may be made for any project that may contaminate a sole source aquifer so as to create a significant public health hazard.

The 1986 amendments to the SDWA established a Wellhead Protection program (WHP) that the States may use to protect public drinking wells and springs, "...within their jurisdiction from contaminants which may have any adverse effects on the health of persons." EPA issued guidance on the procedures for determining WHP areas in June 1987. States have the option of using this guidance. Guidance was issued on June 19, 1987 and notice was published in the Federal Register.

4.2 SUMMARY OF SDWA ARARs FOR CERCLA ACTIONS

Under the SDWA, EPA has developed the following programs:

- Drinking water standards;
- Underground Injection Control program; and
- Sole-source Aquifer and Wellhead Protection programs.

In each of these areas, EPA has promulgated regulations that could be potential ARARs or developed guidance that could be considered for CERCLA actions. The following subsections discuss these potential ARARs in greater detail. (Chapter 1, Exhibit 1-1 of this guidance presents a summary of potential SDWA ARARs in each of these areas and the appropriate CFR citations.)

4.2.1 DRINKING WATER STANDARDS

EPA has promulgated drinking water regulations designed to protect human health from the potential adverse effects of drinking water contaminants. These drinking water regulations generally apply to community water systems, which are public water systems having at least 15 service connections or serving an average of at least 25 year-round residents.[3] The drinking water standards and regulations promulgated in July 1987 for eight synthetic organic chemicals (52 FR 25690, July 8, 1987) also apply to a new category of suppliers referred to as non-transient, non-community systems.[4] These systems are those that regularly serve at least 25 of the same persons over 6 months per year (e.g., rural schools).

Use of MCLs/MCLGs/SMCLs

Primary drinking water regulations include MCLs for specific contaminants. MCLs are enforceable standards which apply to specified contaminants which EPA has determined have an adverse effect on human health. MCLs are set at levels that are protective of human health, and are set as close to MCLGs[5] as is feasible taking into account available treatment technologies and the costs to large public water systems. MCLGs, in contrast, are strictly health-based and do not take cost or feasibility into account. As health goals, MCLGs are established at levels at which no known or anticipated adverse effects on the health of persons occur and which allow an adequate margin of safety. To date, MCLs have been promulgated for 30 specific chemicals (10 inorganics, 14 organic chemicals including pesticides, and total trihalomethanes, certain radionuclides, coliform bacteria, and turbidity). The SDWA amendments of 1986 require EPA to promulgate MCLs for 83 specific contaminants (including reproposal of the earlier-promulgated 30 contaminants with the exception of silver and total trihalomethanes) by June 1989. A list of these 83 contaminants and their promulgation schedule is provided in Exhibit 4-2. MCLGs have been published for 8 organic contaminants and for fluoride. A list of current MCLs and MCLGs is presented in Exhibit 1-1. MCLGs have been proposed for 40 additional organic and inorganic contaminants. A list of currently proposed MCLGs is presented in Exhibit 4-1.

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[3] Certain drinking water standards also apply to non-community water systems. These include standards for nitrate, turbidity, and microbiological concentrations (40 CFR §141.11, 40 CFR §141.13, and 40 CFR §141.14 respectively).

[4] EPA plans to continue to extend its drinking water regulations to non-transient, non-community systems.

[5] Recommended maximum contaminant levels (RMCLs) were renamed maximum contaminant level goals (MCLGs) by the 1986 Amendments to the Safe Drinking Water Act.

EXHIBIT 4-1

Proposed Maximum Contaminant Level Goals (MCLGs)
Under the Safe Drinking Water Act a/
(1985)

CHEMICAL	PROPOSED MCLGs (mg/l) b/
Acrylamide	0
Alachlor	0
Aldicarb	0.009
Aldicarb sulfoxide	0.009
Aldicarb sulfone	0.009
Arsenic	0.05
Asbestos	7.1 c/
Barium	1.5
Cadmium	0.005
Carbofuran	0.036
Chlordane	0
Chromium	0.12
Copper	1.3
Dibromochloropropane	0
o-Dichlorobenzene	0
1,2-cis-Dichloroethylene	0.07
1,2-trans-Dichloroethylene	0.07
1,2-Dichloropropane	0.006
2,4-D	0.07
Epichlorohydrin	0
Ethylbenzene	0.68
Ethylene dibromide (EDB)	0
Heptachlor	0
Heptachlor epoxide	0
Lead	0.02
Lindane	0.0002
Mercury	0.003
Methoxychlor	0.34
Monochlorobenzene	0.06
Nitrate	10
Nitrite	1
Polychlorinated biphenyls	0
Pentachlorophenol	0.22
Selenium	0.045
Styrene	0.14
Tetrachloroethylene	0

EXHIBIT 4-1
(Continued)

Proposed Maximum Contaminant Level Goals (MCLGs)
Under the Safe Drinking Water Act
(1985)

CHEMICAL	PROPOSED MCLGs (mg/l) a/
Toluene	2
Toxaphene	0
2,4,5-TP	0.052
Xylene	0.44

a/ A list of final MCLs and MCLGs is presented in Exhibit 1-1. There are currently no proposed MCLs.

b/ MCLG = Maximum contaminant level goal; proposed values taken from 50 FR 46936 (November 13, 1985). EPA will repropose these MCLGs with the proposal of MCLs for these chemicals. This proposal is expected in May/June 1988.

c/ Million fibers per liter >10q in length.

EXHIBIT 4-2

List of 83 Contaminants for Which MCLs Must Be Promulgated by June 1989

9 MCLs Currently Final

Benzene	1,2-Dichloroethane	1,1,1-Trichloroethane
Carbon Tetrachloride	1,1-Dichloroethylene	Trichloroethylene
p- Dichlorobenzene	Flouride	Vinyl Chloride

40 Contaminants Mandated for MCL Promulgation by June 1988[6]

Acrylamide	o-Dichlorobenzene	*Lindane
Aldicarb	cis-1,2, Dichloro- ethylene	*Mercury
Alachlor	trans- 1,2, Dichloro- ethylene	*Methoxychlor
*Arsenic	*2,4- Dichlorophenoxy- acetic Acid (2,4-D)	*Nitrate
Asbestos	1-2, Dichloropropane	PCBs
*Barium	Epichlorohydrin	Pentachlorophenol
*Cadmium	Ethyl Benzene	*Selenium
Carbofuran	Ethylene Dibromide	*2,4,5- TP Silvex
Chlordane	Giardia Lamblia	Styrene
Chlorobenzene	Heptachlor	Toluene
*Chromium	Heptachlor Epoxide	*Toxaphene
*Coliform Bacteria	*Lead	*Turbidity
Copper		Viruses
Dibromochloropropane (DBCP)		Xylene

34 Contaminants Mandated for MCL Promulgation by June 1989

Adipates	*Endrin	*Radium 226 and 228
Aldicarb Sulfone	Endothall	Radon
Aldicarb Sulfoxide	Glyphosate	Simazine
Antimony	*Gross alpha particle activity	Standard Plate Count
Atrazine	Hexachlorocyclopentadiene	Sulfate
Beryllium	Legionella	2,3,7,8 - TCDD (Dioxin)
*Beta Particle - Photon Radioactivity	Methylene Chloride	Tetrachloroethylene
Cyanide	Nickel	Thallium
Dalapon	PAHs	Trichlorobenzine
Dinoseb	Phthalates	1,1,2 - Trichloroethane
Diquat	Pichloram	Uranium
		Vydate

* 19 MCLs to be reproposed.

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[6] At the time of this manual's publication, no MCLs for these contaminants had been proposed or promulgated under the SDWA amendments of 1986.

EXHIBIT 4-3

Secondary Maximum Contaminant Levels (SMCLs)
Under the Safe Drinking Water Act

CONTAMINANT	LEVEL
Chloride	250 mg/l
Color	15 color units
Copper	1 mg/l
Corrosivity	Noncorrosive
Fluoride	2.0 mg/l
Foaming agents	0.5 mg/l
Iron	0.3 mg/l
Manganese	0.05 mg/l
Odor	3 threshold odor number
pH	6.5-8.5
Sulfate	250 mg/l
Total dissolved solids (TDS)	500 mg/l
Zinc	5 mg/l

Source: 40 CFR §143.3.

For water that is to be used for drinking, the MCLs set under the Safe Drinking Water Act are generally the applicable or relevant and appropriate standard. MCLs are applicable where the water will be provided directly to 25 or more people or will be supplied to 15 or more service connections. If MCLs are applicable, they are applied at the tap. In addition, MCLs are relevant and appropriate as in situ cleanup standards where either surface water or ground water is or may be used for drinking water. When no promulgated standard exists for a given contaminant, proposed MCLs are to be given greater consideration among the to-be-considered advisories.

A standard for drinking water more stringent than an MCL may be needed in special circumstances, such as where multiple contaminants in groundwater or multiple pathways of exposure present extraordinary risks (i.e., above an individual lifetime cancer risk of 10^{-4}). In setting a level more stringent than the MCL in such cases, a site-specific determination should be made by considering MCLGs, the Agency's policy on the use of appropriate risk ranges for carcinogens, levels of quantification, and other pertinent guidelines. Prior consultation with Headquarters contacts in the Office of Emergency and Remedial Response or the Office of Waste Programs Enforcement, as appropriate, is encouraged in such cases.

The responsibility for enforcing primary drinking water regulations resides with the appropriate State government agency in those States where EPA has granted the State primary enforcement authority or with EPA in the two States that do not have primary enforcement (Indiana and Wyoming). Suppliers of water may be assessed criminal or civil penalties for violations of primary drinking water regulations.[1] In addition, suppliers are required to notify the public regarding violations of primary drinking water standards.

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 apply to public water systems and are measured at the tap of the user of the system. A list of existing SMCLs is presented in Exhibit 4-3. For States that have adopted SMCLs as additional drinking water standards, SMCLs are potential State ARARs, depending on site conditions.

Variances and Exemptions[2]

Public water suppliers may also obtain variances or exemptions from complying with primary MCLs if certain criteria are met. Detailed procedures for applying for a variance or exemption are described in the regulations.[7] Granting of an exemption or variance is contingent upon demonstrating that noncompliance will not result in an unreasonable risk to human health.

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[7] 40 CFR §142.40 and 40 CFR §142.50 respectively.

In general, variances are granted only to water supply systems in which the characteristic of the existing raw water sources precludes attainment of MCLs, even with the application of best available technology. Variances must include compliance schedules, which are determined by State water offices. Exemptions are typically granted in situations where, due to compelling factors (which may include economic factors), a public water system is unable to comply with the primary MCLs. As with variances, exemptions must include a schedule for eventual compliance with the primary drinking water regulations. The distinction between the two is that exemptions may only be given to a public water system that was in operation on the effective date of any MCL or treatment technique requirement. Variances may only be granted to public water systems that have installed best available technology, treatment techniques, or other means that EPA finds are available. The final date for compliance provided in any schedule in the case of any exemption may be extended to a maximum period of three years from the date of the exemption (except for systems serving fewer than 500 service connections).

In addition, at CERCLA sites that are causing the public water supplies in the area to violate SDWA standards, the RPM should work closely with the water suppliers in developing remedial options and, if necessary, in assisting the water suppliers in obtaining temporary variances or exemptions if appropriate. However, the RPM should first coordinate this activity with the Regional drinking water program.

4.2.2 UNDERGROUND INJECTION CONTROL (UIC) PROGRAM

Overview

Underground injection wells are divided into five general classes of wells for permitting and regulatory purposes.[8] The applicable UIC technical and procedural standards and criteria vary according to the class of well. The five classes of wells are:

- Class I wells are those used to inject industrial, hazardous and municipal wastes beneath the lower most formation containing, within one-quarter (1/4) mile of the well bore, an underground drinking water source.[9]

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[8] According to 40 CFR §144.3, a well is defined as a bored, drilled or driven shaft, or a dug hole, whose depth is greater than the largest surface dimension.

[9] According to 40 CFR §146.3, an underground source of drinking water is defined as any aquifer or its portion that (1) supplies any public water supply or contains a sufficient quantity of water to supply a public water system, and currently supplies drinking water for human consumption or contains fewer than 10,000 mg/l total dissolved solids, and (2) is not an exempted aquifer according to 40 CFR §146.4.

- Class II wells are used to dispose of fluids which are brought to the surface in connection with oil and gas production, to inject fluids for the enhanced recovery of oil or gas, or to store liquid hydrocarbons.

- Class III wells are those used to inject fluids for the extraction of minerals.

- Class IV wells are used to inject hazardous waste or radioactive waste into or above a formation that, within one-quarter (1/4) mile of the well, contains an underground drinking water source. Operation or construction of Class IV wells is prohibited and allowed only for the reinjection of treated wastes as part of a CERCLA or RCRA cleanup action.

- Class V wells include all wells not incorporated in Classes I-IV. Typical examples of such wells are recharge wells, septic system wells, and shallow industrial (non-hazardous) disposal wells.

Of the five classes of wells, Class I, Class IV, and Class V wells are the classes most likely to be associated with CERCLA actions. For Class I and Class IV wells, the injection of hazardous wastes is involved.[10] An abandoned or failed Class I or Class IV injection well facility could be the site of CERCLA action. In addition, UIC requirements may be ARARs for CERCLA remedial actions involving the reinjection of treated ground water. Class II and Class III wells are unlikely to be associated with CERCLA actions and are not discussed further in this section. The Agency is in the process of developing standards applicable to Class V wells. However, a CERCLA site cleanup could involve reinjection of wastewater that is not defined as hazardous (i.e., the wastewater does not meet the definition of hazardous waste) to a Class V well.

Two important distinctions between Class I and Class IV wells are the location and existing quality of the aquifer above, into, or below which wastes will or are being injected. Class I wells are used for disposing hazardous waste beneath the lowermost formation containing within one-quarter mile of the well, an underground source of drinking water. Class IV wells are used for disposing hazardous waste into or above a formation containing within one-quarter mile of the well, an underground source of drinking water. However,

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[10] Hazardous wastes in the UIC program means a hazardous waste as defined in 40 CFR §261.3. In summary, a hazardous waste is a solid waste that either exhibits any hazardous characteristics (ignitability, corrosivity, reactivity, EP toxicity), or that has been named hazardous and listed, and has not been excluded by regulation (e.g., household wastes, domestic sewage, irrigation return flows, mining overburden returned to site, and agricultural wastes).

the operation or construction of Class IV wells is prohibited, and allowed only where the wells are used to reinject treated ground water into the same formation from which it was withdrawn as part of a CERCLA cleanup or a RCRA corrective action (40 CFR §144.13). There are two clarifications regarding Class IV wells contained in 40 CFR §144.13(d) that should also be noted:

- The injection of hazardous wastes into aquifers that have been exempted pursuant to 40 CFR §146.4 (and are otherwise below the lowermost underground source of drinking water) are considered to be Class I wells, rather than Class IV wells, and subject to Class I UIC regulations;[11] and

- The injection of hazardous wastes where no underground source of drinking water exists within one-quarter mile of the well, provided that EPA or the authorized State determines that such injection is isolated to ensure injected wastes do not migrate from the injection zone, are considered to be Class I wells rather than Class IV wells, and subject to Class I UIC regulations.

The UIC program regulates underground injections into the five classes of wells described above. Operation of these injection wells must be authorized by permit or rule if the injection results in the movement of fluid containing any contaminant into an underground source of drinking water, and if contaminants present in injected fluids cause a violation of any primary drinking water standard (see section 4.2.1) or adversely affect the health of persons.

Underground injection wells that are constructed off-site are subject to all provisions of the SDWA relating to underground injection of fluids and must be permitted by an authorized State agency or EPA and comply with the UIC permit requirements. Superfund sites that construct underground injection wells on-site are not required to comply with the administrative requirements of the UIC program, however, they must meet the substantive requirements of this program where the requirement is determined to be applicable or relevant and appropriate to the CERCLA remedial action.

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[11] In general, an aquifer that is not currently used for drinking purposes, and cannot be used for drinking water in the future due to insufficient yield or excessive contamination, may be officially designated as an "exempted aquifer" by EPA or an authorized State agency (subject to EPA approval). (40 CFR §146.4)

4.2.2.1 Guidelines for Determining Substantive Requirements

The injection of hazardous wastes from CERCLA sites into wells constructed both on-site and off-site must meet the substantive requirements of the UIC program including general program requirements that apply to Class I, Class IV, and Class V wells, and specific criteria and standards applicable only to Class I wells.

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 adversely affect the health of persons (40 CFR §144.12). This requirement applies to all classes of wells, including Class I, Class IV, and Class V wells.

There currently are no requirements for the injection into Class V wells. However, if injection into a Class V well could cause the water in the receiving underground source of drinking water to violate primary drinking water regulations, then EPA or the authorized State agency could require the issuance of a permit that could include the substantive requirements of the UIC program (40 CFR §144.12(c)). Such substantive requirements may be ARAR for on-site actions.

The Hazardous and Solid Wastes Amendments of 1984 include a provision banning RCRA restricted wastes from land disposal unless the Agency promulgates specific treatment levels for each waste based on the Best Demonstrated Available Technology (BDAT) and in accordance with the statutory schedule.[12] Thus far, the Agency has promulgated treatment levels for certain solvent- and dioxin-containing wastes (40 CFR §268.40) and the "California list" prohibitions (40 CFR §268.32) were effective in July 1987.

Until August 1988, solvents, dioxins, chlorophenols, and the "California list" are exempt from these treatment standards <u>only</u> when they are disposed of via deep well injection.[13] This method of land disposal, however, will be banned after August 1988, if the Agency determines that this practice for these specified wastes is not protective of human health and the environment, or the Agency fails to make such a determination by August 1988.

Thus, CERCLA sites that involve the discharge of hazardous wastes into UIC wells currently do not have to comply with BDAT treatment levels. However, beginning August 1988, before RCRA restricted wastes can be disposed in a Class I well (as part of an on-site or off-site activity), or contaminated ground water can be reinjected into a Class IV well (as part of an on-site activity), the wastes or the ground water must attain any treatment levels that may have been promulgated for each constituent disposed in the injection well, or be

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[12] RCRA §§3004(d), (e), (g), (m), and (h).

[13] RCRA §3004(f).

subject to one of several variances provided for in 40 CFR Part 268 for each RCRA listed waste present at the injection well.[14]

Class I wells are also required to obtain a RCRA permit-by-rule as a condition for injecting hazardous waste. For any UIC permit issued to a Class I well after November 8, 1984, RCRA permit-by-rule provisions require the owner/operator of the well to comply with RCRA corrective action for releases from solid waste management units (40 CFR §264.101). Therefore, a RCRA permit-by-rule issued after November 8, 1984 must address any necessary corrective action not only for the injection well, but for all solid waste management units at the facility. For any UIC permit for Class I wells issued prior to November 8, 1984, RCRA corrective action requirements for releases from solid waste management units will be addressed upon permit reissuance.[15]

All owners and operators of underground injection wells are subject to UIC closure requirements. These closure requirements include the preparation and submission of a plugging and abandonment plan. For Class I wells, this plan has to be submitted in accordance with the requirements provided in 40 CFR §144.28(c). For Class IV wells, closure plan requirements are provided in 40 CFR §144.23(b).

Finally, owners and operators of Class I wells are subject to additional UIC operating requirements including:

- Construction Requirements. Various requirements are specified for the construction of Class I wells including the type of casing and cementing for the well, appropriate geophysical well logging and other test requirements, etc. (40 CFR §146.12).

- Operating Requirements. The operation of Class I wells are subject to specific operating requirements, including use of approved fluids surrounding the outermost casing and maintenance of injection pressure

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[14] The Agency is required to promulgate regulations for RCRA restricted wastes in accordance with a statutory schedule. If the Agency fails to meet this schedule, then certain wastes present at a CERCLA site may be banned from land disposal.

[15] The UIC program corrective action requirements (40 CFR §144.55) are limited to repairing well defects to prevent releases from the well. The term RCRA corrective action, as used in this context, is broader and requires control to not only prevent releases from the well, but to also clean-up past releases from the well. RCRA regulatory amendments have been proposed (51 FR 10706; March 28, 1986) to clarify the corrective action requirements for hazardous waste injection wells.

(40 CFR §§144.28(f) and 146.13).

- Monitoring Requirements. At a minimum, monitoring requirements for Class I wells include analysis of the injected fluids; installation and use of continuous recording devices to monitor injection pressure, flow rate and volume, and pressure on the annulus; demonstration of mechanical integrity (in accordance with 40 CFR §146.8) at least every 5 years; and use of monitoring wells in the area of review[16] to monitor migration of fluids into, and pressure in, underground sources of drinking water (40 CFR §146.13(b)). As part of the suggested coordination between CERCLA RPMs and UIC program (EPA Regional and/or State) personnel, monitoring results should be provided to the appropriate UIC program office.

4.2.2.2 Administrative Requirements of the UIC Program

The UIC program establishes administrative requirements that must be complied with prior to and after UIC permit issuance or authorization by rule. These requirements would not be considered ARARs for on-site injection of wastes because they are procedural or administrative in nature. However, they would be requirements to be complied with for off-site injection of wastes into wells. These administrative requirements include:

- 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 (40 CFR §144.31). For new wells, this application must be submitted to EPA or an approved State within a reasonable time prior to construction of the well. For existing Class I and Class IV wells, this application must be submitted within six months after the approval or promulgation of a State UIC program, or to EPA as expeditiously as practicable (but no later than 1 year and 4 years after the effective date of the UIC program for Class I wells and Class IV wells, respectively).[17]

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[16] According to 40 CFR §146.6, the area of review for an injection well can be defined as either the zone of endangering influence or a fixed radius around the well.

[17] Specific UIC application requirements are contained in 40 CFR §144.31(e).

- 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 (40 CFR §144.26). This inventory must be submitted no later than 1 year after the approval or promulgation of a State UIC program, or to EPA no later than 60 days after the effective date of the UIC program (for Class IV wells only). Owners and operators of Class I wells do not need to submit inventory information to EPA if a permit application (as described above) is submitted within one year of the effective date of the program. Further, for EPA administered programs only, other additional information may be required to be submitted that is necessary to determine whether a well is endangering an underground source of drinking water (40 CFR §144.27).

  Consistent with the suggested CERCLA/UIC Office Coordination described in section 4.2.2.3 below, RPMs should provide inventory information (for both on-site and off-site injection wells) for input to the Federal Underground Reporting System (FURS). The FURS is a computerized data base that tracks inventory information for the UIC program.

- Reporting Requirements. The UIC program requires owners and operators of Class I wells to maintain records and report quarterly on the characteristics of injection fluids and ground-water monitoring wells (if required) and various operating parameters (e.g., injection pressure, flow rate, etc.) (40 CFR §146.13(c)). In addition, Class I wells authorized by rule are required to report orally within 24 hours any noncompliance that may endanger health or the environment (40 CFR §144.28(b)). There are no reporting requirements for Class IV wells under the UIC program.

4.2.2.3 Coordination Between CERCLA Program and UIC Office

Before developing or considering remedial options that involve the use of underground injection wells, CERCLA RPMs should contact the appropriate State or EPA Regional office responsible for administering the UIC program to ensure compliance with substantive requirements (on-site and off-site) and all administrative requirements (off-site). RPMs should also contact appropriate State or EPA Regional office personnel responsible for issuing permits under RCRA, to ensure that any UIC well that requires a RCRA permit-by-rule is in compliance with RCRA corrective action requirements.

4.2.3 SOLE SOURCE AQUIFER (SSA) PROGRAM

Designation of SSAs and Review of Federally Financed Projects

The SDWA permits EPA to designate aquifers that are the sole or principal drinking water source for an area and which, if contaminated, would present a significant hazard to human health, as "sole source aquifers." Under the Sole Source Aquifer program, Federal financial assistance may not be committed for any project that may contaminate a sole source aquifer so as to create a significant public health hazard. Federal financial assistance may be committed to design the project to avoid contamination of the aquifer.[18]

In general, projects that could be subject to review under the Sole Source Aquifer (SSA) program include highway or building construction projects, either of which could have potentially detrimental effects on public health and the surrounding environment. As a general matter CERCLA activities would not in and of themselves increase preexisting 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.

Demonstration Program

The 1986 amendments to the SDWA also established procedures for the development, implementation, and assessment of demonstration programs designed to protect critical aquifer protection areas in sole source aquifers. The primary component of a SSA Demonstration Program is the development of a comprehensive management plan to maintain the quality of ground water in critical protection areas. The specific components of a protection plan must include several elements, including designation of the specific actions and management practices to be implemented to prevent adverse impacts on ground water quality. Any State, municipal or local government, or political subdivision, or planning entity, that identifies a critical aquifer protection area over which it has authority may apply to EPA for selection of such area for a demonstration program.

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[18] Following SDWA §1424(e), EPA issued guidance, in February 1987, on the sole source aquifer process entitled "Sole Source Aquifer Designation Petitioner Guidance." For purposes of the Edward Underground Aquifer, the sole source aquifer in San Antonio, Federal financial assistance is defined in 40 CFR §149.2 in part "as any financial benefits provided directly as aid to a project by a department, agency, or instrumentality of the Federal government in any form including contracts, grants, and loan guarantees."

4.2.4 WELLHEAD PROTECTION PROGRAM

One provision in the SDWA amendments of 1986 directs 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 sub-surface. The Agency is responsible for publishing guidance to assist the States in preparing their wellhead protection programs. The Office of Ground-Water Protection issued this guidance in June, 1987.[19] The statute requires States to adopt and submit program plans within 3 years of enactment of the SDWA amendments. EPA is charged with reviewing these programs and ensuring that they comply with the requirements outlined under SDWA, including identifying all potential anthropogenic sources of contaminants, outlining programs for protecting wells from such contaminants, and describing contingency plans for replacing wells affected by contaminants. Finally, EPA is authorized to make grants to assist in the development and implementation of the State programs.

Because the Wellhead Protection program is designed to be run by the States, the program will involve no Federal ARAR provisions. Nonetheless, State wellhead protection programs may impose requirements with which a Federal agency must comply, unless specifically exempted by the President.[20] Thus, there may be ARARs under the State wellhead protection programs with which CERCLA response actions must comply. For example, a State program may contain requirements for protecting a municipal water source or replacing it if contaminated. RPMs should be alert to State programs as they develop over the next several years. It is suggested that RPMs coordinate with Regional drinking water program personnel assigned to the Wellhead Protection program. Regional personnel will be familiar with the progress of State programs, and can assist in the beginning of a CERCLA response action to determine ARARs.

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[19] See Guidance For Applicants For State Wellhead Protection Program Assistance Funds Under The Safe Drinking Water Act, EPA, (June 1987).

[20] Section 1428(h) of SDWA requires that Federal agencies comply with both substantive and procedural State program requirements. However, according to CERCLA §121, on-site CERCLA actions need only comply with substantive program requirements.

CHAPTER 5

GROUND-WATER PROTECTION POLICIES

5.0 OVERVIEW OF THE GROUND-WATER PROTECTION STRATEGY

The Environmental Protection Agency (EPA) is charged with the responsibility to adopt and enforce policies and regulations to protect the nation's ground water under several different statutes, including CERCLA, the Resource Conservation and Recovery Act, the Safe Drinking Water Act, the Clean Water Act, the Toxic Substances Control Act, and the Federal Insecticide, Fungicide, and Rodenticide Act. In response to the need to organize and coordinate the various programs that protect ground water, EPA issued its "Ground-Water Protection Strategy" in 1984. Although the Strategy is not a promulgated requirement and therefore would not be a potential ARAR for a Superfund site, it does list several policy statements to be considered when developing a protective remedy. The Strategy outlined a number of specific activities, including:

- strengthening EPA's organization for ground-water management and cooperation between Federal and State Agencies;
- issuing guidelines on classifying ground water for EPA decisions affecting ground-water protection and corrective action; and
- assessing the problems that may exist from unaddressed sources of contamination.

The need to strengthen EPA's ground-water management led to the creation of the Office of Ground-Water Protection (OGWP). In addition to coordinating the Agency's Ground-Water Protection Strategy, OGWP is also administering programs mandated under SDWA that are geared specifically toward ground-water protection, including the Sole Source Aquifer (see section 4.2.3) and Wellhead Protection programs (see section 4.2.4).

5.1 OGWP GROUND-WATER CLASSIFICATION GUIDELINES

To help achieve consistency among programs through appropriate guidance, ground-water classification guidelines, based on the policy that different ground waters merit different levels of protection, were developed under the Strategy. Again, since the ground-water classification guidelines are not promulgated regulations, they are not potential ARARs for a Superfund site. Under the OGWP Classification Guidelines,[1] ground waters are classified in one of three classification categories (I, II, or III), based upon ecological importance, replaceability, and vulnerability considerations. Irreplaceable

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[1] In December 1986, EPA published the "Guidelines for Ground-Water Classification under the EPA Ground-Water Protection Strategy" (final draft).

ground water that is currently used by a substantial population or ground water that supports an ecologically vital habitat is considered Class I. Class II ground water consists of water that is currently being used or water that might be used as a drinking water source in the future. Ground water that cannot be used for drinking water due to insufficient quality (e.g., high salinity or widespread naturally occurring contamination) or quantity is considered Class III.

5.2 SUPERFUND APPROACH TO GROUND-WATER RESTORATION

The Ground-Water Protection Strategy and the draft Classification Guidelines emphasize the protection of ground-water resources, while the CERCLA policies outlined in the "Draft Guidance on Remedial Actions for Contaminated Ground Water at Superfund Sites," focus on the restoration of contaminated ground waters. Under Superfund, ground waters are restored based in large part on their characteristics, primarily: vulnerability, use, and value. The goal of the Superfund program's approach is to return ground waters to their beneficial uses, e.g., restore current or potential sources of drinking water to drinking water quality. The restoration should be accomplished within a time frame that is reasonable given the particular circumstances at a site. As necessary, current ground-water users may be provided with an alternate source of drinking water or well-head treatment. In formulating a ground-water cleanup approach, the following factors are analyzed.

- Determining the Characteristics of the Ground Water. Using the Ground-Water Protection Strategy and the EPA Guidelines for Ground-Water Classification as guides, a determination is made as to whether the contaminated ground water falls within Class I, II, or III. The classification methodology assists in the characterization of the ground-water's vulnerability, use, and, value.[2] In applying the classification methodology to Superfund sites, additional judgment should be exercised. For example:

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[2] Ground-water classifications performed at Superfund sites are site-specific and limited in scope to the Superfund remedial action that will be undertaken. Classifications performed by EPA's Superfund program do not apply to that geographical area in general nor to any other actions that may be undertaken under any other State or Federal program, or private actions. The classification scheme described above may be superseded by other classification schemes that may have been promulgated by a State and are applicable or relevant and appropriate to the Superfund cleanup. This approach may also be modified by State ARARs that derive from wellhead protection programs which may require protection of a municipal water source, or replacement if that source is contaminated.

-- The Superfund program may define a Classification Review Area that is larger or smaller than the 2-mile radius specified in the proposed guidelines based on a site-specific determination;

-- The Superfund program may use methods other than the DRASTIC[3] model for predicting aquifer vulnerability to contamination;

-- In establishing the aquifer characteristics, the Superfund program would always consider factors other than yield in determining that an aquifer is unusable; and

-- The Superfund program may initiate investigations of other sources when background levels of contamination exist rather than treating the aquifer as Class III.

Additional modifications of the specific criteria established in the classification guidelines may be warranted when site specific investigations reveal factors that the guidelines do not address.

o Identifying ARARs and Establishing Cleanup Goals. MCLs are the probable relevant and appropriate Federal standards for aquifers with Class I and Class II characteristics, i.e., irreplaceable, current or potential drinking water sources.[4] For aquifers with Class III characteristics, i.e., which cannot be used for drinking water because of high salinity or widespread naturally occurring contamination, MCLs are neither applicable nor relevant and appropriate. Further, consistent with Superfund site compliance with RCRA ground-water protection standards, the use of background levels will generally not be adopted by the Superfund program in establishing remediation levels for

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[3] National Well Water Association "DRASTIC: A Standardized System for Evaluating Ground Water Pollution Potential Using Hydrogeologic Settings", EPA/600/2-85/018, May 1985.

[4] EPA Class I ground waters include both those serving substantial populations and those that are ecologically vital. Where ground waters are Class I due to being ecologically vital, MCLs may not be stringent enough to protect the ecosystem. If this is the case, then site-specific standards should be developed to address protection of the ecosystem.

Class III aquifers (see discussion presented in Chapter 2, section 2.7.4.2). While cleanup of aquifers with Class III characteristics is not likely, in some cases source control or other measures (such as point-of-use treatment) may be undertaken in order to prevent further contamination or to mitigate risk from exposure. Also, the need for environmental protection may determine the necessity and extent of ground-water remediation for such aquifers.

Cleanup levels should be selected based on an evaluation of the information developed during the risk assessment for the site.

If MCLs or more stringent State standards are not available or are not sufficiently protective, Federal and State environmental and public health criteria, advisories, guidance and proposed standards should be considered, along with MCLGs for special circumstances (discussed on p. 4-6). The to-be-considered (TBC) materials include: proposed MCLs, health advisories, drinking water equivalent levels, or risk specific doses, and State health advisories.

- Evaluation of Cleanup Alternatives. Alternatives should be developed that meet the concentration goals, and also on the basis of the effectiveness, implementability, and cost of each alternative.

  Superfund's approach to ground-water cleanup calls for development of a limited number of ground-water cleanup alternatives expressed in terms of a remediation level (i.e., cleanup concentration in the ground water), a time period for restoration to the preliminary remediation level for all locations in the area of attainment, and the technology or approach that will be used to achieve those goals.

  In evaluating remedial technologies and other methodologies for ground-water cleanup, technical and cost factors are of special importance. The technical practicability of each alternative must be evaluated in light of the contaminant characteristics and hydrogeological conditions which may not allow effective implementation of the alternative to clean up the ground water.

  Complex fate and transport mechanisms of contaminated ground waters often make it difficult to accurately

predict the performance of the ground-water remedial action. Therefore, the remedial process must be flexible and allow changes in the remedy based on the performance of several years of operation. If the chosen remedial action does not meet performance expectations after a period of operation, the Superfund program has to decide the extent to which further or different action is necessary and appropriate to protection human health and the environment.

- State Ground-Water Protection Programs. In addition to the EPA policy for ground-water classification and protection as outlined in the "Ground-Water Protection Strategy", many States have also begun adopting protection strategies and classification systems. In fact, the Strategy recognizes that States have the principal role in ground-water protection. The May 1985 OGWP document, "Selected State and Territory Ground-Water Classification Systems," outlines several State classification systems, some of which are more strict (i.e., more protective of certain ground-water resources) than the Federal system. For example, Wyoming has promulgated a regulation that recognizes seven classes of ground water. Consequently, a ground water that would be considered Class III under the EPA program might be placed under a more protected classification under the Wyoming program (e.g., "ground water suitable for industry"). If the State has promulgated a particular cleanup level associated with the class specifications that is more stringent than the Federal standards, then this cleanup level would be ARAR.

  In developing response options for Superfund sites that include contaminated ground water, the CERCLA RPM should contact the appropriate State or EPA Regional Ground-Water Office to ensure identification and compliance with State ARARs and consideration of State ground-water programs.

19. Criminal and civil penalties can be assessed only by States. EPA may only commence civil actions for violations of primary drinking water regulations.

20. Obtaining a variance or exemption requires a finding that an unreasonable risk to human health will not result. The Office of Drinking Water is developing guidance to define "unreasonable risk to human health."

HYPOTHETICAL SCENARIO ILLUSTRATING HOW APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS ARE IDENTIFIED AND USED

The following hypothetical scenario illustrates the process of determining whether particular requirements are applicable or relevant and appropriate to the actions to be taken at this hypothetical site. The purpose of this hypothetical scenario is to provide an example of how certain site-specific conditions would be analyzed, not to analyze fully all aspects of all ARARs for the site. Thus, only some of the potential chemical-specific, location-specific, and action-specific alternatives for the site are analyzed. The scenario has been designed to illustrate ARARs from several different statutes, and currently provides examples of RCRA, SDWA, and CWA requirements.

SITE CONDITIONS

The Flintstone site is a 9-acre abandoned hazardous waste disposal area. The site was used as a sand and gravel pit until the early 1970s. The pit was then used for the indiscriminate illegal dumping of household refuse, chemical sludges, construction debris, and hazardous liquids. Diagram 1 provides details of the site surroundings.

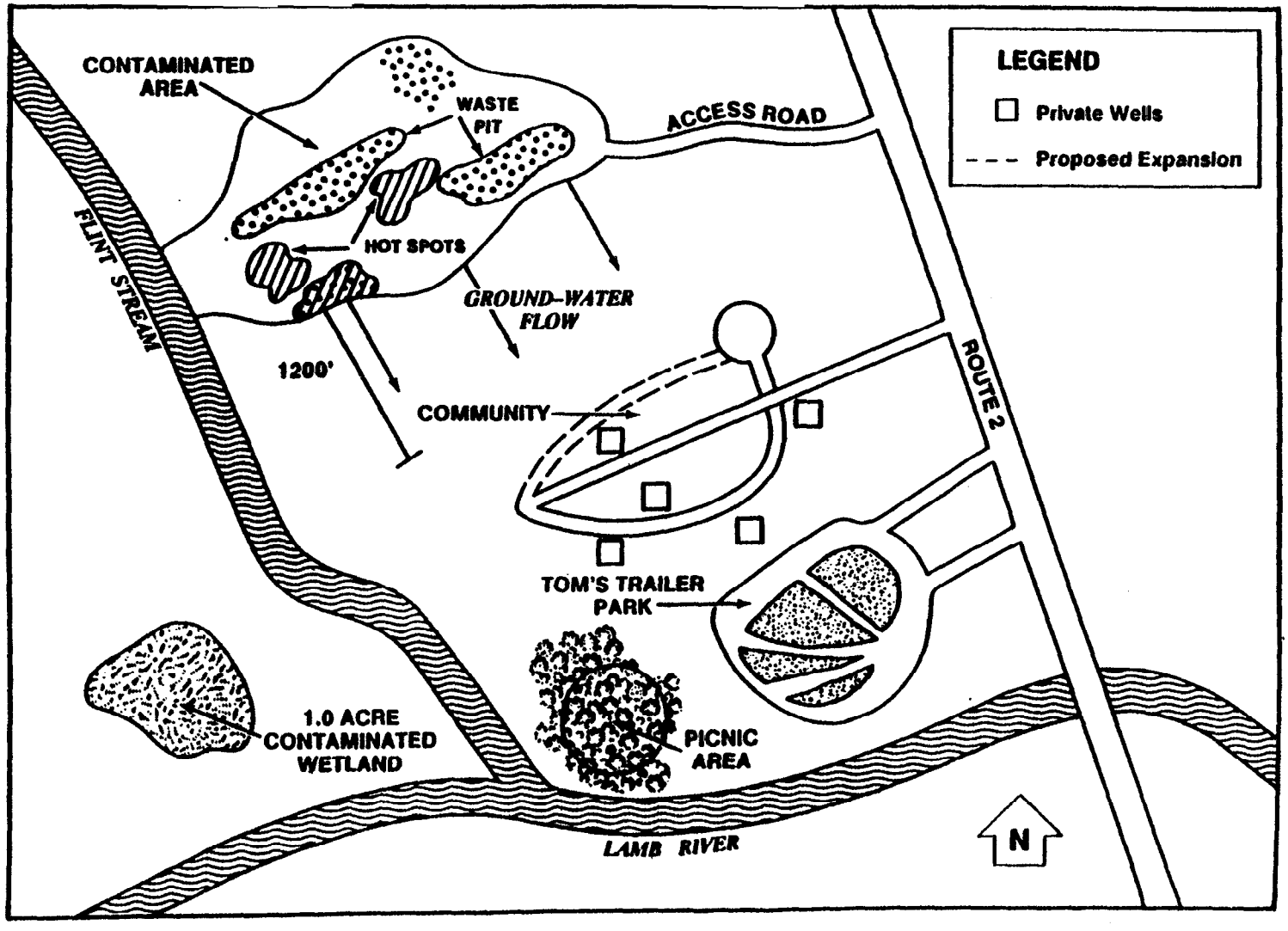
Disposal methods for the liquid material and sludges included:

- Discharge of the sludge-like material directly into pits at the site;
- Abandonment of over 2,000 drums of various types of chemical waste on the surface of the site;
- Dumping/burial of drummed materials in shallow trenches in the area; and
- Pouring of the contents of the drums directly onto the surface.

Solid wastes (refuse, tires, trash, empty drums, and construction debris) cover approximately 6 acres of the 9-acre site to an average depth of 10 feet. The depth of the fill materials ranges from 4 to 13 feet, in some areas extending below the water table, and includes an estimated 19,000 cubic yards of contaminated material. Areas of contaminated soil or "hot spots" outside of the waste pits resulted from flooding and overtopping of the pits during heavy rainfall and seasonal fluctuations in the ground-water level. One of the "hot spots" contains a number of discarded drums. Approximately 4,000 cubic yards of contaminated materials similar to those disposed of at the site were also dumped in a 1-acre wetlands area southwest of the gravel pit. This unauthorized fill may be subject to enforcement under the Clean Water Act, and mitigation could be required (under CWA §404 and related regulations as

Diagram 1

Flintstones's Site Surroundings



* NOT TO SCALE

relevant and appropriate to the CERCLA action -- see p.3-30).[1] Finally, PCB-contaminated oils were sprayed along Route 2 and the dirt access road leading to the site.

Ground water passing under the site flows southeast toward the Lamb River. The contaminant plume leaves the site and spreads diffusely due to the fractured bedrock underlying the site. Contamination of the aquifer is increased by pumping of wells in the local area, causing elevated levels of contaminants to be drawn into the aquifer. Ground-water flow in the aquifer is 50 ft/yr. Contaminants entering the ground water from the main site will reach the Lamb River after 10 to 12 years, with the contaminant plume reaching a steady state condition in approximately 16 years. The levels of observed on-site soil contamination are sufficient to act as a source of continuing ground-water contamination for several years if remedial actions are not initiated. Ground water, sampled at test wells 1,000 feet downgradient of the site, is contaminated with methylene chloride, trichloroethylene (TCE), benzene, cadmium, chromium, and lead.

The area surrounding the Flintstone site is primarily residential. The closest residences are within 600 feet of the southern perimeter of the site. Drinking water wells at several private residences located near the site are contaminated. Residents of these homes are currently being supplied bottled water.

IDENTIFICATION AND ANALYSIS OF CHEMICAL-SPECIFIC REQUIREMENTS

During the scoping of the RI/FS, chemical-specific requirements for the site are initially identified.[2] For chemicals, this is done by comparing the chemicals identified at the site with the list of chemical-specific ARARs in Exhibit 1-1 of Chapter 1 of this manual. The following table summarizes the data on chemicals found on the site:

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[1] The 1-acre area represents the extent of the wetland as verified by Regional dredge and fill program personnel. The areas outside of the waste pits which have been subject to flooding and high ground-water tables have been determined not to be wetlands.

[2] Identification of chemical-specific ARARs should be modified and revised as necessary throughout the RI/FS. Note too that design changes or respecifications may result in further refinement of all types of ARARs.

Summary of Data on Chemicals Found on Site

Waste	Concentration	Media Affected
Volatile Organic Solvents		
trichloroethylene (TCE)	22ppb-43ppb	Ground water
methylene chloride	60 ppm	Ground water
benzene	200 ppb	Ground water
Metals		
cadmium, chromium, lead	>.05ppm	Ground water

In identifying potential ARARs for these chemicals, the following procedure would be used (Note that this example works through the procedure for only one of the chemicals listed above.)

Identification of Chemical-specific ARARs

First, consult Exhibit 1-1 in Chapter 1 to determine if a chemical-specific standard or standards have been established for the chemicals. The chemical-specific standards for one of the chemicals in this example, trichloroethylene, are listed below, as taken from Exhibit 1-1.

Chemical-Specific Standards for Trichloroethylene

SDWA MCL	5.0×10^{-03} mg/l
CWA Ambient Water Quality Criteria	
Aquatic Life (Freshwater Acute)	$4.5 \times 10^{+01}$ mg/l
Aquatic Life (Freshwater Chronic)	$2.1 \times 10^{+01}$ mg/l
Aquatic Life (Marine Acute)	2.0 mg/l
Human Health (Water and Fish Ingestion)	2.7×10^{-03} mg/l
Human Health (Fish Ingestion only)	8.1×10^{-02} mg/l

Exhibit 1-1 also contains a Maximum Contaminant Level Goal (MCLG) of 0 mg/l, which should be considered in special circumstances, such as where multiple contaminants are found in the ground water or where multiple pathways of exposure present extraordinary risks (i.e., individual lifetime cancer risk above 10^{-4}).

Analysis of Chemical-specific ARARs

Determination of Applicability

Second, following the procedures in Exhibit 1-5 of Chapter 1, determine if any of the listed chemical-specific standards fully address the particular site-specific conditions and is applicable. In this case, the individual wells in the local community are not public sources of drinking water. Therefore, the SDWA standards would not be applicable.

Determination of Relevance and Appropriateness

Third, determine which of the standards, if any, address situations sufficiently similar to the CERCLA site conditions that they should be treated as probable relevant and appropriate requirements. As the Superfund program gains further experience in identification of site-specific ARARs, the step-by-step analysis described here may be supplemented by policy decisions on the relevance and appropriateness of some ARARs. For example, EPA has determined as a matter of policy that MCLs will be relevant and appropriate for ground water or surface water that currently is or may in the future be used directly for drinking. (In these cases, the MCLs should be met in the surface water or ground water itself.) The following analysis of the MCL for trichloroethylene is included to explain the logic of this policy in terms of ARARs.

In this hypothetical situation, the ground-water flow is toward private wells. Although the water under the site is not a current source of public drinking water, and the wells do not belong to a public water system and thus do not meet the jurisdictional prerequisites for the SDWA requirements, the water may be a potential future source of drinking water. Because the contaminated ground water may be used directly for drinking water in the future, the MCL for trichloroethylene should be identified as a probable relevant and appropriate standard. Generally, use the factors listed in Exhibit 1-7 to determine if the requirement is potentially relevant at the site. If the requirement is relevant, focus on the purpose of the requirement, the characteristics of the site and contamination, the character of the release, the duration of the activity, and the basis for any waiver or exception to determine if the requirement is appropriate. With respect to the SDWA MCL for trichloroethylene, for example, the following factors would be considered:

	SDWA Requirement	Problem at CERCLA Site
Objective:	Provide safe drinking water	Contamination of drinking water source
Purpose:	Avert TCE contamination	Avert TCE contamination
Media:	Ground water	Ground water
Substance:	Trichloroethylene	Trichloroethylene

Parties:	Public drinking water system	Private drinking water wells
Activity:	Provision of water	Cleanup of contamination
Variances:	None	Not relevant
Place:	Drinking water tap	Aquifer
Facility:	Public drinking water source	Uncontrolled waste site
Use of Resource:	Human consumption	Human consumption/ other uses not specified

Based on this comparison, the CERCLA situation appears to be sufficiently similar to the problems addressed by the SDWA requirement that the SDWA MCL for trichloroethylene would be considered relevant. Considering (1) the purpose of the requirement and the purpose of the CERCLA action (both are directed toward protection of current and potential drinking water), (2) the substance covered by the requirement (trichloroethylene) and (3) the fact that EPA has decided that MCLs are appropriate for future drinking water, it can be judged that MCLs are both relevant <u>and</u> appropriate.

Water Quality Criteria (WQC) more stringent than a SDWA MCL may be found relevant and appropriate when there are environmental factors that are being considered at a site, such as protection of aquatic organisms. In this hypothetical situation, cleanup of the ground water under the waste pits will not be carried out in order to protect aquatic wildlife in Flint Stream since the plume of contaminated ground water will never reach the stream. Contaminated ground water is not currently reaching the Lamb River, and is not expected to do so at a level that would substantially harm aquatic life in the future. The WQCs for protection of aquatic life therefore are not relevant and appropriate for the site. Water quality criteria for protection of human health may be relevant and appropriate depending on the likely route of exposure. However, if the potential for human exposure to contaminants in the Lamb River existed, then WQC for protection of human health (for fish consumption) should be considered, or if the wetlands area were contaminated with TCE, and the cleanup goal was to make the water in the wetlands suitable for aquatic life, it would be necessary to consider ambient water quality criteria and State water quality standards. If such a State water quality standard were established for protection of aquatic life, the standard would be applicable.

<u>ARARs and Risk Assessment</u>

Standards identified as potential ARARs, as well as TBCs, should be analyzed according to the procedures outlined in the <u>Superfund Public Health Evaluation Manual</u>. Guidelines or criteria found in the to-be-considered

category should be used when ARARs do not exist for a particular chemical or when the risk assessment indicates that existing ARARs are not sufficient to protect human health or the environment.

A similar analysis should be conducted for each of the other potentially ARAR chemical-specific standards.

IDENTIFICATION AND ANALYSIS OF LOCATION-SPECIFIC REQUIREMENTS

Identification and analysis of location-specific requirements should follow the same general procedure as outlined above for chemical-specific requirements. The locational characteristics of the site should be compared to the location-specific requirements listed in Exhibit 1-2 in Chapter 1. In this case, a review of the Flintstone site location reveals several characteristics that should be analyzed further. They include:

- Flint Stream or Lamb River may be wild, scenic, or recreational rivers;
- Site may be within 100-year floodplain; and
- Remedial actions may affect wetland.

For purposes of this hypothetical example, it is assumed that neither the stream nor the river has been designated a wild, scenic, or recreational river, and that the site is not within a floodplain. Therefore, the requirements listed in Exhibit 1-2 will not be ARARs based on those characteristics. For actions affecting the 1.0 acre contaminated wetlands area, however, Exhibit 1-2 lists CWA §404, 40 CFR Part 230, Army Corps of Engineers regulations (33 CFR Parts 320-330), and 40 CFR Part 6, Appendix A, as potential ARARs. An assessment of the potential effects of the remedial action on the wetland should be made during the RI/FS. Consultation with the State and contacts with the §404 Wetlands Protection Office in the Region should be made to determine if special steps are required to avoid adverse effects. In this hypothetical situation, because dredged or fill material will not be discharged into the wetland as part of the remedial action, CWA §404, 40 CFR Part 230, and Army Corps of Engineers regulations (33 CFR Parts 320-330) are not applicable. However, 40 CFR Part 6, Appendix A, which is EPA's statement of procedures on wetlands protection, requires, to the extent possible, that remedial activities avoid long- and short-term adverse impacts associated with the destruction or modification of wetlands. When there are no practicable alternatives to conducting such activities in wetlands, the potential harm should be minimized.

IDENTIFICATION AND ANALYSIS OF ACTION-SPECIFIC REQUIREMENTS

Cleanup at the hypothetical Flintstone Site will probably involve a large number of different remedial activities. It is assumed that several actions would be considered, including:

- The consolidation of waste from the contaminated wetland area by picking it up and removing it to one of the waste pits on the main site;

- Extraction of contaminated ground water, treating it, and discharging it to a publicly owned treatment works (POTW);

- Extraction of contaminated ground water, treating it, and discharging it directly to Flint Stream; and

- Extraction of contaminated ground water, treating it, and injecting it back into the aquifer.

Not all of these potential actions at the site are analyzed in this hypothetical scenario. The procedure used, however, would be followed for each of the potential actions.

Identification of Action-specific ARARs

First, the potential action-specific ARARs for each of the actions under consideration would be identified by consulting Exhibit 1-3 in Chapter 1, which lists action-specific requirements under RCRA (including the Hazardous and Solid Waste Amendments of 1984) and the CWA. In this hypothetical situation, for example, Exhibit 1-3 indicates that the potential requirements involved in consolidation will differ depending on whether the consolidation occurs within units or between units. Among the requirements are land disposal restrictions, closure requirements, and post-closure care requirements.

Analysis of Action-specific ARARs

Exhibit 1-3 also lists the prerequisites for applicability of the requirements associated with each of the actions listed. After potential ARARs have been identified, the next step is to determine whether the prerequisites for RCRA applicability are satisfied by the site-specific conditions for the actions under consideration. In this case, Exhibit 1-3 indicates that the prerequisites for applicability of the consolidation requirements are placement of hazardous wastes into another unit. In analyzing these prerequisites, therefore, first determine whether RCRA hazardous wastes or constituents are involved in the action. Trichloroethylene is listed RCRA waste #U228 and cadmium, chromium, and lead are hazardous waste constituents. However, it should not be assumed that these materials are RCRA hazardous wastes. Testing or attempts to identify the origin of the constituents should be undertaken, when necessary, to determine whether the first prerequisite, that the wastes are RCRA hazardous wastes, is satisfied. Second, analyze the prerequisite concerning placement of the wastes. In this situation, movement of contaminated materials from the wetland area across the boundary of the 1.0 acre unit and placement of the waste in the second unit would satisfy the prerequisite, because the site consists of two separate areas of contamination, and the materials are being

removed from the first and placed in the second.

Because the prerequisites associated with consolidation are satisfied, next it is necessary to consider the requirements listed under Exhibit 1-3 for land-disposal requirements and restrictions, for closure requirements, and for post-closure care and monitoring, since they are triggered if consolidation between two units occurs. If the wastes are being consolidated in a new landfill, the entry in Exhibit 1-3 for construction of a new landfill on site should next be consulted to determine the requirements for that action. If, on the other hand, the wastes are being consolidated in an existing landfill (which would not be the case in this hypothetical scenario) the entry in Exhibit 1-3 for closure with waste in place may be relevant and appropriate. In either situation, additional prerequisites are listed in Exhibit 1-3 and regulatory citations are provided so that additional details about the requirements may be obtained if necessary. The identification of which requirements would be ARARs would depend, in part, on the further actions to be taken and the wastes involved. If, for example, the wastes are subject to the land disposal bans under RCRA, then treatment to Best Demonstrated Available Technology (BDAT) levels would be required before the wastes could be land disposed.

Action-specific requirements for other potential actions at the site would be analyzed in the same way as the consolidation action described above. For example, direct discharge to Flint Stream or indirect discharge to a POTW are actions that Exhibit 1-3 indicates are subject to discharge requirements established pursuant to the Clean Water Act. Specifically, the direct discharge of treated ground water to Flint Stream is subject to National Pollutant Discharge Elimination System (NPDES) Program discharge standards and requirements. According to the draft NCP, "on-site" is defined for permitting purposes to include the "areal extent of contamination and all suitable areas in very close proximity to the contamination necessary for implementation of the response action." For this hypothetical example, the area of contamination resulting from the abandoned hazardous waste area is directly adjacent to Flint Stream. Therefore the extraction and treatment of contaminated ground water, and subsequent discharge to Flint Stream is considered an on-site action due to the proximity of the site to Flint Stream. As such, the discharge need not have a NPDES permit, but must meet substantive ARARs. As discussed in Chapter 3, these substantive requirements for the Flintstone site include discharge limits. These limits would be based on the more stringent standards between the following:

- <u>Technology-based standards</u>. Because the Flintstone site was used for indiscriminate illegal dumping, and not for the sole use of an industrial generator of hazardous waste, there are no applicable EPA effluent guidelines. Therefore, technology-based standards have to be set using best professional judgment. The proposed response alternative for the Flintstone site must be reviewed to ensure the use of treatment technologies that have been proven effective to treat the pollutants present in the contaminated ground water. Numerical effluent limits or treatment efficiency requirements can be

developed.

- o Water-quality criteria/State standards. The identification of which water quality criteria/State standards would be applicable or relevant and appropriate depends primarily on the designated use of Flint Stream. If, for example, the State designation of Flint Stream required protection and propagation of fish and aquatic life, EPA water quality criteria for the protection of aquatic life (or applicable or relevant and appropriate State water quality standards, if available) would need to be met for each pollutant of concern prior to discharge.

Other substantive NPDES requirements such as effluent toxicity monitoring or best management practices would also have to be evaluated based on the Flintstone conditions. The appropriate EPA/State Water Program Office should be consulted regarding all substantive NPDES requirements that may be applicable or relevant and appropriate for the Flintstone site.

Prior to the determination to discharge treated ground water from the Flintstone site to a POTW, it first must be determined if the POTW is in compliance with applicable Federal laws (i.e., the POTW's NPDES permit and pretreatment program requirements). Therefore, the Flintstone site manager needs to evaluate the POTW's record of compliance. To do this, the Flintstone site manager would need to contact the POTW oversight authority (i.e., appropriate EPA Region or delegated State Water Office) to collect data pertaining to the POTW's compliance status. If the POTW is out of compliance with applicable laws, then according to CERCLA §121(d)(3), the discharge to the POTW should be prohibited.

A determination of the POTW's ability to accept the treated ground water should also be made during the remedial alternatives analysis under the RI/FS process. Factors that should be considered for this determination are discussed in Section 3.3.2. and include, for example, evaluating waste compatibility with the POTW. The Flintstone site manager should coordinate with the appropriate Water Division officials and their State counterparts and POTW representatives in evaluating the potential use of the POTW for the discharge of Flintstone site wastewater.

If the remedial alternative under consideration involves discharge to a POTW, the pollutants to be discharged must be identified carefully. Certain pollutants are specifically precluded from discharge into a POTW (those that will create a fire or an explosion hazard in the POTW, for example). Other discharges must specifically comply with local POTW pretreatment programs. These local pretreatment programs typically have specific requirements regarding discharge to their POTW. For example, any local limits for the pollutants of concern at the Flintstone site would have to be complied with prior to discharge to the POTW. Any other specific discharge requirements of a POTW (e.g., prohibitions such as temperature, color, etc.) are considered applicable and must be complied with.

Other substantive requirements for discharge to POTWs include RCRA permit-by-rule requirements, which must be complied with for discharges of RCRA wastes to POTWs by truck, rail, or dedicated pipe. If the treated ground water is transported by a dedicated pipe from the site directly to the POTW, the POTW would be subject to the RCRA permit-by-rule provisions, and will have to also be in compliance with RCRA requirements in NPDES permits. The Flintstone site would also need to meet applicable RCRA requirements, including manifesting requirements, etc. Specific Clean Water Act ARARs are discussed in greater detail in Chapter 3.

For the underground injection of treated ground water, Underground Injection Control (UIC) program requirements established under the Safe Drinking Water Act are potential ARARs (see 40 CFR Part 144). The identification of which specific requirements would apply depends on the type of injection well constructed at the site. Class I, Class IV and Class V wells are the three classes most likely to be associated with CERCLA actions. For the Flintstone site, contaminated ground water is to be extracted, treated, and reinjected back into the ground. The proposed well bore is located within one-quarter mile of an underground drinking water source. Therefore, the well is classified as a Class IV well. Such wells may be used for cleanup at CERCLA sites (40 CFR §144.13(c)). Further, the proposed well bore will be located within the Flintstone site. Therefore, this is considered an on-site discharge. No UIC permit is required, but substantive UIC program requirements must be met.

Substantive requirements for Class IV injection wells include:

- The general requirement that 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;
- Applicable RCRA provisions; and
- Construction, operating, and closure requirements.

A more detailed discussion of these requirements is provided in Section 4.1.2.

APPENDIX

OVERVIEW OF MAJOR ENVIRONMENTAL STATUTES AND REGULATIONS

1. OVERVIEW OF RESOURCE CONSERVATION AND RECOVERY ACT

1.1 OFFICE OF SOLID WASTE

This section describes the Resource Conservation and Recovery Act (RCRA) of 1976, the additions to the Act made in the Hazardous and Solid Waste Amendments (HSWA) of 1984, and accompanying regulations finalized or proposed by October 1, 1987. As the major federal statute creating standards for the treatment, storage, and disposal of hazardous waste, RCRA is the most important source of applicable or relevant and appropriate standards for actions taken pursuant to CERCLA §§104 and 106. The first part of this section provides an overview of the statutes, noting their purpose and structure; the second provides a summary of the important regulatory requirements under RCRA and HSWA.

1.2 OVERVIEW OF RCRA

RCRA was enacted in 1976 to regulate the management of hazardous waste, to ensure the safe disposal of wastes, and to provide for resource recovery from the environment by controlling hazardous wastes "from cradle to grave." The statute attempts to address all aspects of hazardous waste management by establishing essentially a three-step process: (1) identification and listing of wastes to be regulated as hazards; (2) tracking of wastes from the point of generation, through transportation, to the site of final treatment, storage, or disposal; and (3) controlling the management practices used during the treatment, storage, and ultimate disposition of these wastes through technical standards, performance standards, and permitting requirements.

Although certain statutory and regulatory requirements under RCRA apply specifically to generators and transporters, the majority of substantive RCRA requirements affect the management of hazardous waste treatment, storage, and disposal facilities.

RCRA operating standards for treatment, storage, and disposal facilities will be the primary area of interaction between RCRA requirements and CERCLA responses. The authority for these requirements is found in RCRA Subtitle C, §3004, Standards Applicable to Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities. Subtitle C also addresses the other aspects of the three-step process mentioned above, including identification and listing of hazardous waste (§3001); standards applicable to generators and transporters of hazardous waste (§§3002 and 3003); and standards applicable to owners or operators of facilities for treatment,

storage, and disposal of hazardous waste (§3305).

RCRA Subtitle D provides criteria for the disposal of nonhazardous wastes in open dumps and sanitary landfills. These may be applicable or relevant and appropriate for CERCLA actions in a limited number of situations. RCRA §4004(a) requires EPA to issue regulations establishing criteria for determining whether a facility should be classified as a sanitary landfill or as an open dump. It also allows states to develop solid waste management planning programs that set forth a plan for closing open dumps. §4005(a) prohibits open dumping of hazardous or solid waste.

The enactment in November, 1984 of the Hazardous and Solid Waste Amendments of 1984 (HSWA) added significant new provisions to §3004. Among them are new requirements that:

- Prohibit land disposal of certain wastes, including some liquid hazardous wastes and dioxins (this prohibition does not apply legally to disposal from a CERCLA response action for a four-year period after enactment of the amendment; however, it could be determined to be relevant and appropriate before the date of its legal applicability);[1]

- Require a review of each RCRA hazardous waste to determine whether land disposal of the waste should be prohibited.[2] The ban would not apply if an EPA-developed treatment standard for a waste had been met;

- Require (1) the installation of a double liner and a leachate collection system and (2) ground-water monitoring for landfills and surface impoundments, and the use of leak detection systems for certain types of hazardous waste management units;[3]

- Require corrective action for all releases from a solid waste management unit at permitted hazardous waste treatment, storage, or disposal facilities. (Although this requirement applies only to

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[1] Initial land ban regulations were issued in 1986 and are found in 40 CFR Part 268. A correction to these regulations was issued in June, 1987 (52 FR 21010) and additional regulations for "California List" wastes were issued in July, 1987 (52 FR 25760).

[2] The schedule of hazardous wastes to be reviewed by EPA is set out in 40 CFR Part 268.

[3] A Notice of Proposed Rulemaking (NPRM) was issued on May 29, 1987 discussing possible regulations for leak detection requirements. Rules covering the installation of liners and leachate collection systems have also been issued and are found in Subparts I - N of Part 264.

permitted facilities, standards for corrective action developed under RCRA may be applicable or relevant and appropriate to similar CERCLA actions.)[4] In addition, corrective action requirements as necessary or appropriate are authorized under §3004(u); and

- Authorize administrative orders requiring corrective action or other response measure for releases of hazardous waste from interim status facilities.

1.3 RCRA REGULATIONS PERTAINING TO HAZARDOUS WASTE

The RCRA program is largely defined by regulations, which, along with guidance and decisions made in the permitting process, are the source of a great majority of the RCRA program's specific requirements. RCRA requirements that may be applicable or relevant and appropriate to CERCLA response actions are found primarily in the RCRA regulations (40 CFR Parts 260-271).

The RCRA regulations that are of primary importance for CERCLA responses are the Standards for Owners and Operators of Hazardous Waste Treatment, provided in RCRA §3004. These RCRA regulations differ depending on whether a hazardous waste facility has a RCRA permit (40 CFR Part 264) or is operating under interim status (40 CFR Part 265). CERCLA remedies will generally be consistent with the more stringent Part 264 standards, even though a permitted facility is not involved. Therefore, only the Part 264 standards are described here.

Nine of the subparts in 40 CFR Part 264 are potentially applicable or relevant and appropriate to CERCLA. Seven of these subparts establish process-specific standards for particular types of hazardous waste management units:

- Containers (Subpart I)
- Tanks (Subpart J);
- Surface impoundments (Subpart K);
- Waste piles (Subpart L);
- Land treatment (Subpart M);
- Landfills (Subpart N); and
- Incinerators (Subpart O).

The other subparts that are potentially applicable or relevant and appropriate are ground-water protection (Subpart F) and closure and post-closure (Subpart G). These nine subparts are briefly described below.

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[4] Procedures for corrective action are found throughout subparts of the RCRA regulations. A proposed rule covering administrative procedures for corrective action hearings was issued on August 6, 1987 (52 FR 29222).

Subpart F -- Ground-Water Protection (40 CFR §§264.90-264.101)

Subpart F creates broad ground-water protection requirements under RCRA. These requirements include both concentration standards and monitoring requirements and corrective action requirements for regulated units.

The EPA Regional Administrator is required by 40 CFR §264.92 and §264.94 to set ground-water protection standards and concentration limits for Appendix VIII and Appendix IX[5] hazardous constituents once they are detected in the ground water at a hazardous waste land disposal facility. According to 264.94(a), the concentration limits will be based on: (1) the background level of each constituent in the ground water at the time the limit is specified in the permit; (2) maximum concentration limits (MCLs) for 14 specified hazardous constituents if background levels are below these standards; or (3) an "alternate concentration limit' (ACL) that can be set by the Regional Administrator if he determines that a less stringent standard will protect public health and the environment. The factors that should be used to grant an ACL are outlined in 40 CFR §264.94(b).[6]

Subpart F also establishes a three-phase ground-water monitoring program for permitted land disposal facilities. 40 CFR §264.98 outlines the requirements of a "detection monitoring program," to detect the existence of designated hazardous constituents in the ground waters. The detection monitoring program' is a semi-annual monitoring protocol. If hazardous constituents are detected, the ground-water protection strategy (GWPS) must be established.[7]

40 CFR §264.99 outlines the compliance monitoring program that must be established whenever hazardous constituents are detected. During this phase, the owner or operator must conduct compliance monitoring to determine if the levels of constituents exceed the ground-water protection standards (background levels, MCLs, or ACLs) specified in the permit. If GWPS limits are exceeded, the owner or operator must institute a corrective action program to bring the facility back into compliance (40 CFR §264.100). In conjunction with the corrective action program, the owner or operator must also establish effectiveness of the corrective action program. The owner or operator must continue the compliance monitoring program until the GWPS is achieved for

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[5] Rules adding an Appendix IX list were finalized on September 9, 1987 (52 FR 25842).

[6] The factors used to grant an ACL are presented in Chapter 2.

[7] A proposed rule issued August 24, 1987 (52 FR 31948) would establish new standards for determining when hazardous wastes are "detected" in ground water, and thus when corrective action and compliance monitoring provisions would be triggered. This rule would change the definition of "detection", for example, to be "statistically significant evidence of contamination."

three consecutive years before returning to the detection monitoring program.

Subpart G -- Closure and Post-Closure (40 CFR §§264.110-264.120)

Subpart G creates technical and procedural standards for closure and post-closure care of hazardous waste management facilities.

40 CFR §264.111 requires that the owner or operator close the facility in a manner that "minimizes the need for further maintenance" and "controls, minimizes, or eliminates ... post-closure escape of hazardous waste, leachate, contaminated rainfall, or waste decomposition products" to the environment."[8]

Process-specific closure requirements for surface impoundments (40 CFR §264.228) specify that if some wastes or contaminated materials are left in place at final closure, the facility must be closed in accordance with the post-closure requirements contained in 40 CFR §§264.117-.120. Process-specific closure requirements for landfills (40 CFR §264.310) specify that the owner or operator must cover the landfill with a specially designed and constructed final cover. After final closure, the owner or operator must comply with the post-closure requirements contained in 40 CFR §§264.117-264.120. Finally, process-specific closure requirements for waste piles (40 CFR §264.258) specify that if, after removing or decontaminating all residues and making all reasonable efforts to effect removal or decontamination of contaminated components, subsoils, structures, and equipment, the owner or operator finds that not all contaminated subsoils can be practicably removed or decontaminated, he must close the facility and perform post-closure care in accordance with the closure and post-closure care requirements for landfills.[9]

40 CFR §264.12 requires the owner or operator to prepare a written plan as part of the permit conditions that describes how and when the facility will be closed and partially closed, describes procedures for decontamination activities, and includes a schedule for conducting closure. In addition, the owner or operator must notify the Regional Administrator at least 180 days prior to the date he intends to begin closure activities. The closure plans must be reviewed by the Regional Administrator and are subject to the public participation provision in 40 CFR Part 124 as part of the permit review

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[8]The notice of proposed rulemaking issued on May 29, 1987 would add requirements for leak detection systems in most disposal facilities.

[9]A rule issued on March 19, 1987 allows interim status facility owners or operators to remove all contaminants from treatment, storage or disposal facilities and avoid post-closure requirements. The rule provides interim status facilities the same opportunity that already exists for permitted facilities.

process.[10]

40 CFR §264.117 states that monitoring, maintenance, and reporting requirements established for surface impoundments, waste piles, land treatment facilities, and landfills must continue for 30 years following closure. The Regional Administrator may extend or reduce the length of the period based on cause. 40 CFR §264.118 requires the preparation of a written post-closure plan describing planned monitoring and maintenance activities.[11]

Subpart I -- Use and Management of Containers (40 CFR §§264.170-264.178)

Requirements for facilities that store containers of hazardous wastes are provided in 40 CFR Part 264 Subpart I. The major requirements are that the owner or operator must: (1) maintain containers in good condition; (2) inspect container storage areas at least weekly; (3) provide a sloped, crack-free base for all areas storing containers that contain free liquids; (4) refrain from placing incompatible wastes in the same container, and place walls or dikes between containers holding wastes incompatible with other nearby materials; (5) remove all wastes and residues from containment systems upon closure; and (6) locate only containers holding ignitable or reactive waste at least fifty feet from the property line.

Subpart J -- Tanks (40 CFR §§264.190-264.200)

40 CFR Part 264 Subpart J outlines design and management standards for tanks containing hazardous wastes.

On July 14, 1986, EPA promulgated regulations amending the Subpart J requirements.[12] The regulations address tank design, installation, and operating standards and can be summarized as follows:

- The owner or operator must obtain a written assessment of the structural integrity and acceptability of existing tanks systems and designs for new tank systems, reviewed by an independent, qualified, registered professional engineer.

- All new tank systems would be required to be enclosed in a full secondary containment system that would encompass the body of the

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[10] A recent proposed rule (52 FR 35838) establishes procedures under which owners and operators may amend their written closure and post-closure plans.

[11] Post-closure procedure requirements for certain facilities that received wastes between 7/26/82 and 1/26/83 were issued (51 FR 16421) on May 2, 1986). The NPRM of May 29, 1987 would amend these requirements to make them consistent with the double-liner and leak detection systems.

[12] 51 FR 25470, July 14, 1986.

tank and all ancillary equipment and be able to prevent any migration of wastes into the soil. This secondary containment system would be required to be equipped with a leak detection system capable of detecting releases within 24 hours of release.

- Facilities with existing tank systems will be required to install secondary containment systems within specified times based on age and waste type.

- Owners or operators may seek from the Regional Administrator both technology-based and risk-based variances from secondary containment requirements, based on either: (1) a demonstration of no migration of hazardous waste constituents beyond the zone of engineering control; or (2) a demonstration of no substantial present or potential hazard to human health and the environment.

- Annual leak tests must be conducted on non-enterable underground tanks until such time as an adequate secondary containment system could be installed. Either an annual leak test or other type of adequate inspection must also be conducted on enterable types of tanks which do not have secondary containment.

- Inspection requirements have been upgraded to include regular inspection of cathodic protection systems and daily inspection of entire tank systems for leaks, cracks, corrosion, and erosion that may lead to releases.

- The owner or operator must remove a tank from which there has been a leak, spill or which is judged unfit to use. He then must determine the cause of the problem, remove all waste from the tank, contain visible releases, notify appropriate parties as required by other laws (i.e. CERCLA Reportable Quantity requirements), and certify the integrity of the tank before further use.

- Closure requirements include removing waste, residues and contaminated liners, disposing of them as hazardous waste, and conforming with Subparts G and H (including post-closure of tank if necessary).

- The owner or operator must also comply with general operating requirements and with special requirements for ignitable, reactive or incompatible wastes.

EPA recently proposed a comprehensive rule (52 FR 12662, April 17, 1987) to regulate all underground storage tanks (USTs). It proposes standards for "design, construction, installation, release detection and compatibility" and applies them specifically to tanks storing either petroleum products or hazardous substances other than those regulated under Subtitle C of RCRA. These may, however, be relevant and appropriate to Subtitle C hazardous

wastes.

Subpart K -- Surface Impoundments (40 CFR §§264.220-264.249)

40 CFR Part 264 Subpart K establishes design and operating requirements for surface impoundments. The standards require that each new surface impoundment, each new surface impoundment at an existing facility, each replacement of an existing surface impoundment unit, and each lateral expansion of an existing surface impoundment unit must satisfy certain minimum technological requirements, including two or more liners and a leachate collection system between the liners. An alternative liner design may be approved if the Regional Administrator finds that operating practices and locational characteristics together prevent the migration of hazardous constituents into the ground water or surface water at least as effectively as the liners and leachate collection systems. Owners or operators must comply with ground-water monitoring requirements under 40 CFR Part 264 Subpart F, including corrective action, if needed. Impoundments must be removed from service if the liquid level suddenly drops or the dike leaks.

RCRA §3005(j), as amended, requires the owner or operator of any surface impoundment that was in existence and operating under interim status on November 8, 1984, to install two or more liners, a leachate collection system between the liners, and ground-water monitoring by November 8, 1988, (unless the impoundment qualifies for one of four exemptions set out in §3005(j)) or to cease placement, storage, or treatment of hazardous waste in the surface impoundment.

RCRA also required EPA to issue standards mandating that new surface impoundment facilities use an approved leak detection system. EPA issued a notice of proposed rulemaking (NPRM) on May 29, 1987 that would allow a modified version of a leachate collection and removal system (LCRS) between double liners as an adequate leak detector. The NPRM also proposed changes in regulations for replacements and lateral extensions of existing surface impoundment facilities, response activities by owners and operators of facilities, and quality assurance requirements.

At closure, an impoundment operated under Part 264 may be closed by removing and decontaminating all hazardous wastes, residues, liners and subsoils. If all hazardous wastes cannot be removed or decontaminated, then the facility must be capped and post-closure care provided. An owner or operator of an impoundment may also choose to close the impoundment as a disposal facility -- solidify all remaining wastes, cap the facility, and comply with Part 264 post-closure requirements.

Subpart L -- Waste Piles (40 CFR §§264.250-264.269)

Subpart L requires that an owner or operator of a waste pile facility: (1) install a liner under each pile that prevents any migration of waste out of the pile into the adjacent subsurface soil or ground or surface water at

any time during the active life; (2) provide a leachate collection and removal system; (3) provide a run-on control system and a run-off management system; (4) comply with the Subpart F requirements; (5) inspect liners during construction and inspect the wastes at least weekly thereafter; and (6) close the facility by removing or decontaminating all wastes, residues, and contaminated subsoils (or comply with the closure and post-closure requirements applicable to landfills if removal or decontamination of all contaminated subsoils proves impossible). Existing piles are exempt from the liner and leachate collection system requirements but may be affected by the regulations proposed in the NPRM (May 29, 1987)[13].

Subpart M -- Land Treatment (40 CFR §§264.270-264.299)

Subpart M requires that owners or operators of facilities that dispose of hazardous waste by land application: (1) establish a treatment program that demonstrates to the Regional Administrator's satisfaction that all hazardous constituents placed in the treatment zone will be degraded, transformed, or immobilized within that zone; (2) conduct a monitoring program to detect contaminants moving in the unsaturated zone (the subsurface above the water table); and (3) continue all operations during closure and post-closure to maximize the degradation, transformation, or immobilization of hazardous constituents.[14]

Subpart N -- Landfills (40 CFR §§264.300-264.339)

Subpart N requires owners or operators of new landfills, new landfills at an existing facility, replacements of existing landfill units, and lateral expansions of existing landfill units to satisfy the minimum technological requirements for two or more liners and a leachate collection system above and between the liners. In addition, the landfill must have run-on/run-off control systems and control wind dispersal of particulates as necessary; comply with the Subpart F ground-water protection requirements, close each cell of the landfill with a final cover, and institute specified post-closure monitoring and maintenance programs. In addition, 40 CFR §264.314 and §265.314 ban the landfill disposal of bulk or non-containerized liquid hazardous waste. After November 8, 1985, non-hazardous liquids also are generally banned (for more information, see section "Hazardous Solid Waste Amendments - Land Ban").[15]

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[13]A NPRM (May 29,1987, 52 FR 20218) would require double liners and a leachate collection and removal system for the unused portions of existing piles and for any lateral extensions of waste piles and leak detection.

[14]The NPRM would require owners and operators to establish a written response plan to handle any leaks detected at the facility.

[15]The NPRM would require leak detection systems and the development of a written response plan to any leaks that were detected.

Subpart O -- Incinerators (40 CFR §§264.340-264.999)

Subpart O of Part 264 specifies design and operating requirements for any incinerator burning hazardous wastes. For incinerators that only burn wastes listed as hazardous solely by virtue of their ignitability, corrosivity, or reactivity, or some combination thereof, only the closure requirements and waste analyses required prior to incineration are applicable. 40 CFR §264.343 specifies that all incinerators must be constructed and maintained so as to detoxify (by destruction or physical removal in air pollution control systems) at east 99.99 percent (or 99.9999 percent for dioxin wastes) of each "principal organic hazardous constituent" in the input steam, and so as not to emit more than 180 milligrams of particulate matter per cubic meter of stack gas. HCL emissions are limited to 1.8 kg/hr or 1 percent of the HCL in stack gas before controls. 40 CFR §264.347 outlines the parameters the owner/operator must monitor during incinerator operation; 40 CFR §264.351 requires that all wastes, residues, ash, and effluents be removed from the incinerator site at closure and treated as hazardous wastes, if applicable.

Hazardous Solid Waste Amendments - Land Ban

On July 15, 1985, EPA codified into the existing RCRA Subtitle C regulations a set of provisions from the Hazardous and Solid Waste Amendments of 1984 (See 50 FR 28742)(the "Codification Rule"). Although the provisions of the Codification Rule have been integrated into the previously discussed RCRA regulations, they are addressed separately here to highlight the new requirements that the statute imposed. Those provisions likely to have a significant impact on the RCRA regulatory requirements that may be applicable or relevant and appropriate to CERCLA responses are discussed below.

Ban of Liquids in Landfills. HSWA imposed a ban on the placement of bulk or non-containerized liquid hazardous waste or hazardous waste containing free liquids (whether or not absorbents have been added) in any landfill after May 8, 1985, unless it can be demonstrated that:

(1) The only reasonably available alternative for these non-hazardous liquids is a landfill or unlined surface impoundment which already contains, or any reasonably be anticipated to contain, hazardous waste; and

(2) The disposal of the non-hazardous liquids in the landfill will not present a risk of contamination to any underground source of drinking water.

Other Land Ban Rules. EPA issued a rule in May, 1986 (effective June 28, 1986) and an amended rule in November, 1986 that is now codified in 40 CFR Part 268. The rule sets forth the first list of banned wastes that have not undergone the Best Demonstrated Available Technology (BDAT) and the schedule for EPA's review of other wastes that may be affected by the land ban. A

correction to Part 268 was finalized in June, 1987 (52 FR 21010), and a rule finalizing the restrictions on "California List" wastes (liquid hazardous wastes containing PCBs) and hazardous wastes containing HOCs was issued on July 7, 1987.

Delisting Procedures. Prior to HSWA, delisting petitioners were required under 40 CFR §260.22(a) to demonstrate to the satisfaction of the Administrator that the waste in question did not meet any of the criteria under which it was originally listed. Section 260.22 provided that a waste so excluded could still qualify as a hazardous waste if it failed any of the RCRA Subpart C characteristics (ignitability, reactivity, corrosivity, EP toxicity). The codification rule added to 40 CFR §260.22(a) the requirements that, before excluding a waste:

(1) The petitioner must demonstrate to the satisfaction of the Administrator that the waste produced by a particular generating facility does not meet any of the criteria under which the waste was listed as a hazardous or an acutely hazardous waste; and

(2) Based on a complete application, the Administrator must determine, where he has a reasonable basis to believe that factors (including additional constituents) other than those for which the waste was listed could cause the waste to be a hazardous waste, that such factors do not warrant retaining the waste as a hazardous waste. A waste which is so excluded, however, still may be a hazardous waste by operation of Subpart C of Part 261.

Minimum Technological Requirements. HSWA imposed minimum technological requirements that must be met by owners or operators of certain landfills and surface impoundments. Specifically, amended §3004 of RCRA stipulates that a permit for a new landfill or surface impoundment, a new landfill or surface impoundment at an existing facility, or a replacement or lateral expansions of an existing landfill or surface impoundment unit, must require the installation of two or more liners, a leachate collection system above (in the case of a landfill) and between the liners, and ground-water monitoring. The section provides an exemption from liner and leachate collection system standards if alternative design and operating practices, together with locational characteristics, will prevent the migration of hazardous constituents into the ground water or surface water at least as effectively as the liners and leachate collection systems. Amended §3015 of RCRA establishes the applicability of §3004 standards to interim status surface impoundments, landfills, and waste piles receiving wastes after May 8, 1985.[16]

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[16] Regulations concerning minimum technology requirements were proposed on March 28, 1986 (51 FR 10706). Information about the effectiveness of double-liner and leachate collection systems, the subject of the minimum requirements, was published on April 17, 1987 (52 FR 12566).

Corrective Action and Cleanup Beyond Facility Boundary. RCRA §3004 was amended by HSWA to require corrective action for all releases of hazardous waste or constituents from any solid waste management unit at a facility seeking a RCRA permit, regardless of when waste was placed at the unit. RCRA §3004 also directs the Agency to promulgate regulations obligating owners and operators of treatment, storage, and disposal facilities to undertake corrective action beyond the facility boundary where necessary to protect human health and the environment, unless the owner or operator demonstrates to EPA that, despite his best efforts, he or she is unable to obtain the necessary permission to undertake such action. Until EPA promulgates the regulations which are currently being developed, implementation of this statutory provision shall proceed on a case-by-case basis through administrative orders.[17]

Underground Injection. The HSWA added new §7010 to RCRA, banning the injection of hazardous wastes into or above any underground formation which contains, within one-quarter mile of the injection well, an underground source of drinking water. The ban applies to any state not having identical or more stringent prohibitions in effect under an applicable underground injection control program that has been approved or prescribed by EPA under the Safe Drinking Water Act.

1.4 OTHER RCRA REGULATIONS

The following additional RCRA regulations may be applicable or relevant and appropriate to CERCLA responses:

Open Dump Criteria (40 CFR Part 257)

In addition to the subparts of 40 CFR Part 264 described above, the open dump criteria of 40 CFR Part 257 are potentially applicable or relevant and appropriate to CERCLA responses. 40 CFR Part 257 establishes criteria for classifying solid waste disposal facilities to determine which pose a reasonable probability of adverse effects on human health and the environment. Facilities that fail to satisfy the criteria of the Part are classified as open dumps, which must be addressed by State solid waste management plans.

Special Rules Concerning Dioxin

40 CFR Part 261 provides that certain wastes containing tetra, penta, and hexaclorinated dioxins (CDDs) are acute hazardous wastes. Special requirements are set by §§264.175, 264.200, 264.231, 264.259, 264.283, 264.317, and 264.343 for the management standards concerning such wastes. These standards include special requirements for the management of the wastes in a storage, tank, surface impoundment, pile, land treatment unit, landfill,

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[17] A rule on corrective action and cleanup beyond the facility boundary was proposed on March 28, 1986 (51 FR 10706).

or incinerator. EPA has also proposed a rule for the management of the residues resulting from the incineration or thermal treatment of such wastes.[18]

2. OVERVIEW OF CLEAN WATER ACT AND THE WATER QUALITY ACT

This section describes the Clean Water Act (CWA) of 1977, and the amendments to the act made by the Water Quality Act (WQA) of 1987. The section provides an overview of the CWA, noting its purpose, structure, and implementing regulations. The purpose is to provide an overview of the legislative requirements and the implementing regulations of each law that establish potentially applicable or relevant and appropriate requirements for CERCLA activities.

2.1. OVERVIEW OF THE CWA

The objective of the CWA is to restore and maintain the chemical, physical, and biological integrity of the nation's waters. The national goals established to achieve this objective of the CWA are 1) that the discharge of pollutants into waters of the U.S. be eliminated, and 2) that water quality that provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water, be attained. The objective and goals of the CWA are to be achieved through the control of discharges of pollutants to surface waters. The CWA also involves the States (through the implementation of approved programs) in the objective to prevent, reduce, and eliminate the discharge of pollutants to surface waters.

The CWA is organized into five major sections:

- Title I - Research and Related Programs: Establishes grants and contracts for research, development, and training programs for water pollution control.

- Title II - Grants for Construction of Treatment Works: Requires the development and implementation of waste treatment management plans and practices that will achieve the goals of the Act. Provides for the award of grants for the construction of wastewater treatment works.

- Title III - Standards and Enforcement: Requires the establishment of criteria and standards for discharges to surface waters to protect water quality and achieve national performance standards. The authority to enforce these standards is also established.

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18 See 50 FR 37338, September 12, 1985.

- o Title IV - Permits and Licenses: Requires the establishment of regulatory permitting programs to apply and enforce standards established under Title III of the Act.

- o Title V - General Provisions: Establishes provisions associated with the implementation of the requirements of the Act, including emergency powers, citizen suits, judicial review, employee protection, administrative procedures, Federal procurement, and State authority.

The primary areas of interaction between CWA requirements and CERCLA responses occurs under Titles III and IV, where effluent standards and permits are required to be established and applied to discharges to the Nation's waterways. The implementing regulations resulting from the requirements established under Titles III and IV of the CWA are contained throughout Title 40 of the Code of Federal Regulations. Due to the numerous parts of Title 40 published pursuant to the CWA, the following sections will summarize CWA requirements by major Sections contained in Titles III and IV. The major implementing regulations for these sections are also referenced.

2.2 CWA REQUIREMENTS PERTAINING TO CERCLA DISCHARGES

Section 301 - Effluent Limitations

Section 301 of the CWA requires technology-based discharge limitations be established for categories and classes of point sources of pollutants. For conventional pollutants, Section 301 requires that effluent limitations be based upon the application of the best conventional pollutant control technology (BCT). For toxic and nonconventional pollutants, Section 301 requires that effluent limitations be based upon the application of the best available technology economically achievable (BAT). Pretreatment standards are applied to indirect discharges to publicly owned treatment works (POTWs).

Section 302 - Water Quality Related Effluent Limitations

Section 302 authorizes the establishment of more stringent effluent limitations (including alternative BAT effluent control strategies) to protect water quality if technology-based controls established under Section 301 would not assure protection of the intended uses of the receiving waters (e.g., public water supply, agricultural and industrial uses, and recreational uses).

Section 303 - Water Quality Standards and Implementation Plans

Section 303 of the CWA requires States to develop water quality standards that consist of a designated use or uses for the waters and water quality criteria for such waters to protect the use or uses.

The 1987 amendments revise Section 303 of the CWA and requires States to adopt the Federal water quality criteria established for all toxic pollutants

pursuant to Section 304 if the discharge or presence of toxic pollutants could reasonably be expected to interfere with the designated uses adopted by the State. In the absence of numerical criteria, States are required to adopt criteria based upon biological monitoring or assessment methods consistent with those provided in Section 304 of the CWA as amended by the WQA.

Section 304 - Information and Guidelines

Under Section 304 of the CWA, EPA is required to develop and publish criteria, based upon latest scientific knowledge, to be utilized by States in developing water quality standards. Under Section 304, EPA is also required to develop and publish regulations establishing guidelines for the technology-based effluent limitations required in Section 301 of the CWA for categories and classes of point sources of pollutants.[19]

Section 304 of the CWA, as amended in 1987, requires States to develop individual strategies to control toxic pollutant discharges into those waters where application of effluent limitations for point sources, required under Section 301, cannot reasonably attain or maintain applicable water quality standards or the designated use of the waters. In addition, EPA is required to develop and publish guidance on methods for establishing and measuring water quality criteria for toxic pollutants on other bases than pollutant-specific criteria, including biological monitoring and assessment.

Section 306 - National Standards of Performance

Section 306 requires EPA to propose and publish regulations establishing standards of performance for new source discharges. A new source is defined as a building, structure, facility, or installation from which there is a discharge, and the construction of which is started after the publication of proposed national standards of performance (developed pursuant to Section 306) applicable to the source.

Section 307 - Toxic and Pretreatment Effluent Standards

Section 307(a) establishes the list of toxic pollutants (commonly referred to as "priority pollutants") subject to regulation pursuant to the CWA. Technology-based effluent limitations are developed for the priority pollutants for categories or classes of point sources. Section 307(b) requires EPA to develop and promulgate pretreatment standards for the discharge of pollutants into POTWs.

Section 401 - Certification

Any applicant for a Federal license or permit to conduct an operation which may result in any discharge to navigable waters is required to provide

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[19] These effluent guidelines are provided in 40 CFR Parts 405-471.

the Federal permitting agency (e.g., the Army Corps of Engineers) a certification from the State in which the discharge originates (or EPA on a State's behalf in certain circumstances). This certification must state that the discharge will comply with applicable provisions of Sections 301, 302, 303, 306, and 307 of the CWA. If the certifying authority does not act on a request for certification within the specified time, concurrence is deemed waived.

Section 402 - National Pollutant Discharge Elimination System

Section 402 of the CWA establishes the National Pollutant Discharge Elimination System (NPDES) program. All dischargers into navigable waters are required to obtain a NPDES permit, which incorporates the requirements of sections 301, 302, 306, 307 and 403 of the CWA.[20] Section 402 also establishes procedures for implementing the NPDES program, including requirements for authorizing State-operated permit programs.

Section 403 - Ocean Discharge Criteria

Section 403 requires EPA to develop and promulgate guidelines for determining the effects of discharges on the degradation of ocean waters. All discharges to oceans must comply with these guidelines prior to issuance of a permit under Section 402 of the CWA.

Section 404 - Permits for Dredged or Fill Material

Section 404 establishes the requirements to obtain a permit for the discharge of dredged or fill material to navigable waters.[21] All discharges of dredge and fill materials must undergo a public interest analysis to determine whether the benefits reasonably expected to result from the activity outweigh the reasonably foreseeable detriments. Section 404 also establishes the Secretary of the Army (through the Army Corps of Engineers) or delegated State the permitting authority, for 1987 CWA Amendments dredge and fill activities.

1987 CWA Amendments

The enactment of the WQA of 1987 provides amendments and additions to various sections of the CWA. Other significant amendments with potential application to CERCLA activities include:

- Establishment of the National Estuary Program,

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[20] 40 CFR Parts 122-125 provide the implementing regulations for the NPDES program.

[21] 40 CFR Part 230 and 33 CFR Parts 320 through 330 provide the implementing regulations for the Dredge and Fill Program.

the purposes and policies of which are to maintain and enhance the water quality in estuaries, considered to be of great national significance for fish and wildlife resources.

- Clarification of the CWA's prohibition of backsliding on effluent limitations.

- Authorization for grants to States to implement nonpoint source management programs, including ground water quality protection activities.

3. THE SAFE DRINKING WATER ACT

This section describes the Safe Drinking Water Act (SDWA) of 1974, the most recent amendments to the SDWA made in 1986, and accompanying regulations. The first part of this section provides an overview of the SDWA, noting its purpose and structure. The second part of this section provides a summary of the regulatory requirements under the SDWA that are applicable to CERCLA activities. The purpose is to provide an overview of the legislative requirements and the implementing regulations of each law that establish potentially applicable or relevant and appropriate requirements for CERCLA activities.

3.1 OVERVIEW OF THE SDWA

The SDWA was enacted in 1974 in order to assure that all people served by public water systems would be provided with a supply of high quality water. The SDWA established a program to require compliance with national drinking water standards for contaminants that may have an adverse effect on public health. The SDWA also focused on the removal of contaminants found in water supplies as a preventive health measure and established programs intended to protect underground sources of drinking water from contamination.

The SDWA amendments of 1986 established new procedures and deadlines for setting national primary drinking water standards, established a national monitoring program for unregulated contaminants, augmented the underground waste injection control requirements, and established a sole source aquifer demonstration program and a wellhead area protection program.

The SDWA is structured in five parts:

Part A - Definitions: Provides definitions of key terms used in the SDWA.

Part B - Public Water Systems: Requires EPA to establish maximum contaminant level goals and promulgate national primary and secondary drinking water regulations. Part B also provides conditions for giving States the

primary responsibility for enforcement of standards, establishes prohibitions for use of lead in water supply systems, and provides terms for variances and exemptions from national primary drinking water regulations.

Part C - Protection of Underground Sources of Drinking Water: Requires EPA to publish regulations for State underground injection control programs, for State programs to establish wellhead protection areas, and for development, implementation, and assessment of demonstration programs designed to protect critical areas located within areas designated as sole source aquifers.

Part D - Emergency Powers: Empowers EPA to enforce SDWA regulations to protect human health upon failure of State and local authorities to do so.

Part E - General Provisions: Establishes general provisions for the implementation of the SDWA including: assurance of adequate treatment chemicals, grants for State programs; records and inspection requirements; establishment of an advisory council; regulation of Federal agencies; judicial review; and citizens civil actions.

3.2 SDWA REGULATIONS PERTAINING TO CERCLA ACTIVITIES

The following summarizes the SDWA regulation's that may be applicable or relevant and appropriate to CERCLA response actions.

40 CFR Part 141 - National Interim Primary Drinking Water Regulations

40 CFR Part 141 establishes primary drinking water regulations which are designed to protect human health from the potential adverse effects of drinking water contaminants. Both maximum contaminant levels (MCLs) and maximum contaminant level goals (MCLGs) for specific contaminants are provided. Whereas MCLs are enforceable standards, MCLGs are secondary standards, and as such are non-enforceable.

As of July 1987, MCLs have been promulgated for 24 specific chemical (10 inorganics and 14 organic pesticides), total trihalomethanes, certain radionuclides, and coliform bacteria. MCLGs have been promulgated for eight organic contaminants and for fluoride. The 1986 SDWA amendments require EPA to promulgate MCLs for 83 specific contaminants by June 1989.

40 CFR Part 141 also establishes monitoring, reporting, and analytical requirements for public water systems.

40 CFR Part 142 - National Primary Drinking Water Regulations Implementation

40 CFR Part 142 sets forth the regulations for the implementation and enforcement of national primary drinking water standards. In particular, procedures are provided for variances and exemptions from compliance with

MCLs. These variances and exemptions apply to public water suppliers. The requirements for determining the primary enforcement responsibilities of a State are also provided.

40 CFR Part 143 - National Secondary Drinking Water Regulations

This part establishes National Secondary Drinking Water Regulations which consist of secondary maximum contaminant levels (SMCLs). SMCLs are set to regulate contaminants that may affect the aesthetic qualities of drinking water (e.g., color, odor); however, SMCLs are nonenforceable. There are 12 SMCLs promulgated.

40 CFR Part 144 - Underground Injection Control Program

40 CFR Part 144 provide requirements for Underground Injection Control (UIC) Programs and establishes the following classification of wells:

Class I, wells that inject RCRA hazardous or other industrial or municipal waste beneath the lower most formation containing, within one-quarter (1/4) mile of the well bore, an underground drinking water source. An underground source of drinking water is defined as any aquifer or its portion that supplies a public water system or contains fewer than 10,000 mg/l total dissolved solids.

Class II, injection wells associated with oil and natural gas production, recovery, and storage.

Class III, wells that inject fluids for use in extraction of minerals.

Class IV, wells used to inject RCRA hazardous waste into or above a formation that within one-quarter (1/4) mile of the well, contains an underground drinking water source. The operation or construction of Class IV wells is prohibited, and allowed only where the wells are used to reinject treated ground water as part of a CERCLA cleanup or a RCRA corrective action.

Class V, wells not considered to be Class I, II, III, or IV.

Various subparts within Part 144 describe the general requirements for the operation of underground injection wells. These subparts are briefly described below:

o Subpart B - General Program Requirements

Subpart B provides the general requirements for underground injection wells including prohibitions of unauthorized injection, prohibition of movement of fluid into underground sources of drinking water, and requirements for the discharge of hazardous wastes. Injection into Class IV

wells is also prohibited except for the reinjection of contaminated groundwater that has been reinjected into the same formation from which it was drawn pursuant to CERCLA activities.

- Subpart C - Authorization of Underground Injection by Rule

Subpart C authorizes by rule the injection into existing wells for specified periods of time depending upon the class of well involved. Specific requirements for authorization by rule are also specified.

- Subpart D - Authorization by Permit

Subpart D establishes the authorizations necessary to permit underground injection activities.

- Subpart E - Permit Conditions

Subpart E provides the conditions which are applicable to all underground injection activities that require a permit, including corrective action requirements for the injection into Class I wells.

40 CFR Part 146 - Underground Injection Control Program: Criteria and Standards

40 CFR Part 146 sets forth the technical criteria and standards for the UIC program. In particular Subpart B provides the criteria and standards applicable to Class I wells including construction, operating, monitoring and reporting requirements. No criteria and standards currently exist for Class IV wells, which are banned except in cleanups approved under CERCLA or RCRA.

DICTIONARY OF ACRONYMS USED IN MANUAL

ACL	-	Alternate Concentration Limits
AOC	-	Area of Contamination
ARAR	-	Applicable or Relevant and Appropriate Requirement
BAT	-	Best Available Technology Economically Achievable
BCT	-	Best Conventional Pollutant Technology
BDAT	-	Best Demonstrated Available Treatment Technologies
BMP	-	Best Management Practices
BOD	-	Biochemical Oxygen Demand
BPJ	-	Best Professional Judgment
CAA	-	Clean Air Act
CAG	-	Carcinogen Assessment Group
CCWE	-	Constituent Concentration in Waste Extract
CERCLA	-	Comprehensive Environmental Response, Compensation and Liability Act of 1980 (aka Superfund)
COD	-	Chemical Oxygen Demand
CPF	-	Carcinogen Potency Factors
CFR	-	Code of Federal Regulations
CWA	-	Clean Water Act
DSE	-	Domestic Sewage Exclusion
EDB	-	Ethylene Dibromide
EP	-	Extraction Procedure
EPA	-	Environmental Protection Agency
FR	-	Federal Register
FS	-	Feasibility Study
FWQC	-	Federal Water Quality Criteria
GLWQA	-	Great Lakes Water Quality Agreement
GWPS	-	Ground Water Protection Standard
HEA	-	Health Effects Advisories
HSWA	-	Hazardous and Solid Waste Amendments of 1984
IRIS	-	Integrated Risk Information System
IU	-	Industrial User
LC50	-	Lowest Concentration that Will Kill 50 Percent of Test Organisms
LCRS	-	Leachate Collection and Removal System
LDR	-	Land Disposal Restrictions
LPC	-	Limiting Permissible Concentrations
MCLs	-	Maximum Contaminant Levels (SDWA)
MCLGs	-	Maximum Contaminant Level Goals
MPRSA	-	Marine Protection Research and Sanctuaries Act
NCP	-	National Contingency Plan
NHPA	-	National Historic Preservation Act
NOEL	-	No Observable Effect Level
NPDES	-	National Pollutant Discharge Elimination System
NPL	-	National Priorities List
NPRM	-	Notice of Proposed Rulemaking
NTIS	-	National Technical Information Service
OGWP	-	Office of Ground-Water Protection
OSC	-	On-Scene Coordinator
OSW	-	Office of Solid Waste
OSWER	-	Office of Solid Waste and Emergency Response

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OWPE	-	Office of Waste Programs Enforcement
PCB	-	Polychlorinated Biphenyls
PCS	-	Permit Compliance System
POTW	-	Publicly-Owned Treatment Works
PRP	-	Potentially Responsible Party
RCRA	-	Resource Conservation and Recovery Act
RFD	-	Reference Dose
RI/FS	-	Remedial Investigation / Feasibility Study
RMCL	-	Recommended Maximum Contaminant Level (renamed MCLG)
ROD	-	Record of Decisions
RPM	-	Remedial Project Manager
SARA	-	Superfund Amendments and Reauthorization Act
SDWA	-	Safe Drinking Water Act
SI	-	Site Investigation
SIP	-	State Implementation Plan (CAA)
SITE	-	Superfund Innovative Technologies Evaluation
SMCLs	-	Secondary Maximum Containment Levels
SMOA	-	Superfund Memorandum of Agreement
SPHEM	-	Superfund Public Health Evaluation Manual
SSA	-	Sole Source Aquifer
SWMU	-	Solid Waste Management Unit
TBC	-	To Be Considered
TCE	-	Trichloroethylene
TDS	-	Total Dissolved Solids
TSS	-	Total Suspended Solids
UCR	-	Unit Carcinogenic Risk
UIC	-	Underground Injection Control
USDW	-	Underground Source of Drinking Water
WHP	-	Wellhead Protection Program
WQA	-	Water Quality Act
WQC	-	Water Quality Criteria

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