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Comprehensive Five-Year Review Guidance

**Office of Emergency and Remedial Response
U.S. Environmental Protection Agency
Washington, D.C. 20460**

**URL: <http://intranet.epa.gov/oerrinet>
Superfund Information 1-800-424-9346**

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Preface

The U.S. Environmental Protection Agency (EPA) is issuing this guidance to assist EPA staff who conduct five-year reviews of response actions at Superfund sites. EPA personnel should follow the policies and procedures outlined in this guidance to promote consistent implementation of the five-year review process.

Section 121(c) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986, together with the implementing regulation in the National Oil and Hazardous Substances Pollution Contingency Plan, require that remedial actions resulting in any hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure be reviewed every five years to assure protection of human health and the environment.

The five-year review requirement applies to remedial actions selected under CERCLA §121. Therefore, both National Priorities List (NPL) sites and non-NPL sites may be subject to a five-year review. Also, consistent with Executive Order 12580, EPA is responsible for ensuring that five-year reviews are conducted at all NPL sites, with the exception of sites under the jurisdiction, custody, or control of the Department of Defense or the Department of Energy, or Coast Guard sites located in the coastal zone, Great Lakes waters, ports, or harbors.

Although this guidance was prepared for use by EPA personnel, other lead agencies should conduct five-year reviews at sites under their jurisdiction, custody, or control in a manner consistent with this guidance.

The purpose of this guidance is to

- Establish procedures for conducting five-year reviews;
- Facilitate consistency of five-year reviews across the ten EPA Regions;
- Clarify current policy;
- Delineate roles and responsibilities of various entities in conducting or supporting five-year reviews.

This guidance supersedes the following directives on five-year reviews:

- Office of Solid Waste and Emergency Response (OSWER) Directive 9355.7-02 (May 23, 1991), *Structure and Components of Five-Year Reviews* (introduced five-year review requirements and the tiered review level concept)
- OSWER Directive 9355.7-02FS1 (August 1991), Factsheet: *Structure and Components of Five-Year Reviews*
- OSWER Directive 9355.7-02A (July 26, 1994), *Supplemental Five-Year Review Guidance* (introduced the Level 1a review for sites where response is ongoing)
- OSWER Directive 9355.7-03A (December 21, 1995), *Second Supplemental Five-Year Review Guidance* (identified the three purposes of five-year reviews and emphasized that reviews must include a signed protectiveness determination, along with recommendations to correct deficiencies)

Questions or comments concerning this guidance should be directed to:

Carol Bass
Headquarters Five-Year Review Coordinator
U.S. Environmental Protection Agency
Office of Emergency and Remedial Response
Mail Code 5204G
401 M Street, SW
Washington D.C. 20460
(703) 924-0681

This document provides guidance to EPA staff. The guidance is designed to communicate national policy on five-year reviews. The document does not, however, substitute for EPA's statutes or regulations, nor is it a regulation itself. Thus, it cannot impose legally-binding requirements on EPA, States, or the regulated community, and may not apply to a particular situation based upon the circumstances. EPA may change this guidance in the future, as appropriate.

List of Acronyms

ARARs	Applicable or Relevant and Appropriate Requirements
CA	Cooperative Agreement
CAG	Community Advisory Group
CD	Consent Decree
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CFR	Code of Federal Regulations
CIC	Community Involvement Coordinator
CIP	Community Involvement Plan
DoD	Department of Defense
DOE	Department of Energy
EO	Executive Order
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
FCOR	Final Close Out Report
FFA	Federal Facility Agreement
FFRRO	Federal Facilities Restoration and Reuse Office
FR	Federal Register
HASP	Health and Safety Plan
IAG	Interagency Agreement
IRIS	Integrated Risk Information System
MCLs	Maximum Contaminant Levels
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
O&M	Operation and Maintenance
OERR	Office of Emergency and Remedial Response
OSHA	Occupational Safety and Health Administration
OSWER	Office of Solid Waste and Emergency Response
OU	Operable Unit
PCOR	Preliminary Close Out Report
PRP	Potentially Responsible Party
RA	Remedial Action
RAGS	Risk Assessment Guidance for Superfund
RCRA	Resource Conservation and Recovery Act
RD/RA	Remedial Design/Remedial Action
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
SARA	Superfund Amendments and Reauthorization Act of 1986

SMOA	Superfund Memorandum of Agreement
SPIM	Superfund Program Implementation Manual
SSC	Superfund State Contract
TAG	Technical Assistance Grant
TBCs	To Be Considereds
USACE	United States Army Corps of Engineers
USCG	United States Coast Guard
WasteLAN	The Regional database related to CERCLIS

1.0 Overview

This chapter provides U.S. Environmental Protection Agency (EPA) staff and others responsible for conducting five-year reviews with an overview and discussion of the purpose of five-year reviews, the statutory and policy provisions for a review, and the timing and triggering actions for a review. Further, this chapter explains how to prioritize reviews, make recommendations, submit five-year review reports to Headquarters, enter data into WasteLAN, report the status of reviews and of the implementation of follow-up actions to Headquarters, and generate Regional reports. Finally, it explains when reviews may be discontinued, and why site deletion is independent of the requirement for five-year reviews.

1.1 What is the purpose of a five-year review?

The purpose of a five-year review is to determine whether the remedy at a site is protective of human health and the environment. Where a site has remedial actions that are still under construction, a five-year review should confirm that immediate threats have been addressed and that the remedy will be protective when complete. The main purpose of the five-year review is not to reconsider decisions made during the selection of the remedy, but to evaluate the implementation and performance of the selected remedy. In some cases, however, a five-year review report may need to recommend that the remedy be re-evaluated, or that an additional response action be considered. For example, you may find that a remedy will not meet cleanup levels for a contaminant of concern, or you may discover a new contaminant, source, or pathway of exposure. Finally, your five-year review may recommend that the remedy be re-evaluated when a contaminant, source, or pathway has not been sufficiently addressed.

The results of the review are presented in a five-year review report. The five-year review report should 1) state whether the remedy is or is expected to be protective, 2) document any deficiencies identified during the review, and 3) recommend specific actions to ensure that a remedy will be or will continue to be protective. Headquarters reports the results of these reviews to Congress.

1.2 Which sites need five-year reviews?

Whether a site is subject to five-year reviews largely depends on whether hazardous substances, pollutants, or contaminants remain above levels that allow for unlimited use and unrestricted exposure. The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) along with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), call for five-year reviews of certain remedial actions. EPA policy also calls for five-year reviews in some other cases. Thus, EPA classifies each five-year review as either “statutory” or “policy” depending on whether it is required by statute or conducted as a

matter of policy. Section 1.2.1 explains when a site is subject to a review under statute. Section 1.2.2 explains when a site is subject to review as a matter of policy.

1.2.1 When am I required by statute to conduct a review?

The statutory five-year review requirement was added to CERCLA as part of the Superfund Amendments and Reauthorization Act of 1986 (SARA). According to CERCLA, as amended, you must conduct a five-year review if **both** of the following conditions are true:

- 1) Upon completion of the remedial actions, hazardous substances, pollutants, or contaminants will remain above levels that allow for unlimited use and unrestricted exposure¹
- 2) The Record of Decision (ROD) for the site was signed on or after October 17, 1986 (the effective date of SARA²)

CERCLA §121(c), as amended, states:

If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.

The NCP, part 300.430(f)(4)(ii) of the Code of Federal Regulations (CFR), states:

If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.

“Unlimited use and unrestricted exposure” means that there are no restrictions on the potential use of land or other natural resources. If a site is restricted to industrial use because hazardous substances, pollutants, or contaminants remain above levels that allow for unlimited use and unrestricted exposure, you must conduct a five-year review.

1.2.2 Which sites should I review as a matter of policy?

You should conduct a five-year review as a matter of policy for the following types of sites:

- Sites where a remedial action selected on or after October 17, 1986 (called a “post-SARA” remedial action in this guidance), will allow for unlimited use and unrestricted exposure upon completion, but where it will take longer than five years to complete
- Sites where a remedial action selected prior to October 17, 1986 (called a “pre-SARA” remedial action in this guidance) leaves hazardous substances, pollutants, or contaminants onsite above levels that allow for unlimited use and unrestricted exposure
- Sites on the National Priorities List (NPL) with only a removal action (called “NPL removal-only” sites in this guidance), where hazardous substances, pollutants, or contaminants are left onsite above levels that allow for unlimited use and unrestricted exposure, where construction is complete, and where no further action will take place³
- State or Indian Tribe-lead NPL sites, where the remedy is not selected under CERCLA §121 and hazardous substances, pollutants, or contaminants are left onsite above levels that allow for unlimited use and unrestricted exposure

Regions may choose to conduct a policy review at a site with a no action ROD where monitoring is taking place to ensure the absence of contaminants. Regions may also choose to review no action decisions where factors contributing to the assumptions underlying the no action decision may have changed.

Exhibit 1-1 provides examples of the types of remedial actions subject to statutory and policy reviews.

1.3 How do features of the response action or the ROD affect the need for five-year reviews?

A number of factors can affect whether five-year reviews are required by statute or whether they should or may be conducted as a matter of policy. The following sections describe how five-year review provisions apply to some of these special cases.

Exhibit 1-1: Applying Five-Year Review Provisions

If the action/site is...	then a review is...	and examples of remedial actions include...
a post-SARA remedial action that upon completion, will leave hazardous substances, pollutants, or contaminants onsite above levels that allow unlimited use and unrestricted exposure	required by statute	<ul style="list-style-type: none"> – waste stabilization, fixation, or encapsulation onsite – landfill cap or covers and slurry walls – institutional controls
a post-SARA remedial action that upon completion, will not leave hazardous substances, pollutants, or contaminants onsite above levels that allow unlimited use and unrestricted exposure, but requires five or more years to complete	conducted as a matter of EPA policy , until cleanup levels are achieved allowing unlimited use and unrestricted exposure	<ul style="list-style-type: none"> – monitored natural attenuation – groundwater pump and treatment – long-term bioremediation of groundwater or soil – other long-term soil remedies such as soil washing and land farming
a pre-SARA remedial action that currently does not allow unlimited use and unrestricted exposure regardless of whether the action upon completion will leave hazardous substances, pollutants, or contaminants onsite above levels that allow unlimited use and unrestricted exposure	conducted at least once, as a matter of EPA policy	<ul style="list-style-type: none"> – any type of action where hazardous substances, pollutants, or contaminants remain onsite above levels that allow for unlimited use and unrestricted exposure
a removal-only site on the NPL that leaves hazardous substances, pollutants, or contaminants onsite above levels that allow unlimited use and unrestricted exposure	conducted at least once, as a matter of EPA policy	<ul style="list-style-type: none"> – excavation and on/offsite treatment where hazardous substances, pollutants, or contaminants remain onsite above levels that allow for unlimited use and unrestricted exposure
a State or Tribe-lead NPL site where a remedial action not selected under CERCLA §121 leaves hazardous substances, pollutants, or contaminants onsite above levels that allow for unlimited use and unrestricted exposure	conducted at least once, as a matter of EPA policy	<ul style="list-style-type: none"> – any type of action where hazardous substances, pollutants, or contaminants remain onsite above levels that allow for unlimited use and unrestricted exposure
a pre- or post-SARA remedial action that will not leave hazardous substances, pollutants, or contaminants onsite above levels that allow unlimited use and unrestricted exposure and that requires less than five years to complete	not conducted	<ul style="list-style-type: none"> – excavation and on/offsite treatment that attain cleanup levels in less than five years – removal and disposal, achieving cleanup levels – bioremediation of soil or groundwater requiring less than five years – monitored natural attenuation requiring less than five years

1.3.1 Do I need to conduct a five-year review for a site that has been deleted from the NPL?

The five-year review requirement is independent of, and unaffected by, the deletion process.⁴ If your site requires a five-year review, then it must be reviewed every five years regardless of whether it is still on the NPL. It is EPA's policy to delete a site from the NPL when deletion criteria have been satisfied; a site will not be kept on the NPL solely because it is subject to a five-year review. If the site has been deleted or is in the process of being deleted, the five-year review report should address the status of any deletion action.

1.3.2 Should I review a site with a RCRA response?

In 1996, EPA established a policy to defer activities that would otherwise occur under CERCLA to the Resource Conservation and Recovery Act (RCRA) program. The policy is outlined in the memorandum, "Coordination Between RCRA Corrective Action and Closure and CERCLA Site Activities."⁵ It allows site managers to defer cleanup activities for all or part of a site from CERCLA to RCRA (or vice versa). If a site is 1) deferred to RCRA prior to being placed on the NPL, or 2) is deleted from the NPL prior to the selection of the remedy and deferred to RCRA for corrective action, you do not need to conduct a five-year review.

In cases where full deferral is not appropriate, it is possible that both RCRA and CERCLA authorities will be used to address a site. You should conduct a five-year review for all portions of a site for which there is a CERCLA decision document (usually a ROD), and where hazardous substances, pollutants, or contaminants remain. When a RCRA action is included as a portion of a ROD or other CERCLA decision document, the RCRA action should be included in the five-year review.

1.3.3 Should I review a non-NPL remedial action site?

You may need to review a non-NPL remedial action site when a remedy has been selected under CERCLA §121. A non-NPL remedial action site may be subject to review under statute or as a matter of policy. However, you do not need to review 1) sites with only removal actions, and 2) State or Tribe-lead sites where the remedy is not selected under CERCLA §121.

1.3.4 How should I handle a site that has an interim remedial action?

An interim remedial action is treated like any other remedial action for the purpose of five-year reviews. An interim action requires a five-year review if it meets any of the criteria outlined in Sections 1.2.1 or 1.2.2. For instance, if an alternate water supply is installed but hazardous substances, pollutants, or contaminants remain onsite above levels that allow for unlimited use and unrestricted exposure, a review is required by statute. A subsequent action may then reduce the

hazardous substances, pollutants, or contaminants to levels allowing unlimited use and unrestricted exposure. Reviews should continue every five years until contaminants of concern have met these levels, as described in Section 1.11.

1.3.5 How do I determine whether a review is called for by statute or EPA policy at sites with both pre- and post-SARA RODs?

To determine whether a review at your site is called for by statute or as a matter of EPA policy, you should first examine the remedial actions called for in post-SARA RODs. For example, if a remedial action in a post-SARA ROD is subject to review under statute, then the review at your site is considered a statutory review. If the post-SARA actions are not subject to review, you should also examine pre-SARA actions to determine if a review is required as a matter of policy.

When you conduct a review at a site with both pre- and post-SARA RODs, the review should cover the whole site, not just the post-SARA portion of the site.

1.3.6 Should I review a site that has a no action or a no further action ROD?

If either of the following situations apply to a site with a no action or no further action ROD, then you need to conduct a five-year review:

- You are required to conduct a statutory review at a site where a no further action ROD was signed if any action taken under another post-SARA ROD has left hazardous substances, pollutants, or contaminants onsite above levels that allow for unlimited use and unrestricted exposure
- You should conduct a review as a matter of policy at a site with a no action ROD when the site was addressed through a removal action, leaving hazardous substances, pollutants, or contaminants onsite above levels that allow for unlimited use and unrestricted exposure

1.3.7 What if a no action or a no further action ROD includes groundwater monitoring?

If a no action or a no further action ROD assumes unlimited use and unrestricted exposure to groundwater and includes groundwater monitoring, a Region may decide to conduct a review as a matter of policy to ensure that these assumptions are still valid. In this case, the groundwater monitoring is performed to ensure that ROD assumptions regarding no action for groundwater are still valid, rather than to verify the performance of a groundwater restoration or containment remedy.

1.3.8 What if a ROD includes monitored natural attenuation?

Monitored natural attenuation is considered a remedy selected under CERCLA §121. You should review these remedies as a matter of policy when their ultimate goal is to attain cleanup levels that allow for unlimited use and unrestricted exposure. You should carefully examine a ROD labeled “no action” or “no further action” to determine if it includes a monitored natural attenuation remedy.

1.3.9 What if a ROD includes institutional controls?

Institutional controls are considered remedies selected under CERCLA §121. Institutional control remedies frequently require a review under statute, because they often restrict access and use indefinitely. The appropriateness of a statutory or a policy review depends on whether hazardous substances, pollutants, or contaminants will remain above levels that allow for unlimited use and unrestricted exposure once the action is complete. You should carefully examine a ROD labeled “no action” or “no further action” to determine if it includes an institutional control remedy.

1.4 When do I need to complete my five-year review?

You should complete a five-year review and obtain appropriate signatures on the five-year review report within five years of the date of the action recorded in WasteLAN that “triggers” a five-year review. WasteLAN (also sometimes referred to as CERCLIS) is an integrated information system designed to store comprehensive and reliable data across the Superfund program.

One key difference between reviews required by statute and those conducted as a matter of policy is when these reviews first begin. As described in Sections 1.4.1 and 1.4.2, the first statutory review at a site should be conducted within five years of the initiation of a remedial action. The first policy review at a site, however, does not need to be completed until five years after the site is designated construction complete. Regions may choose to conduct a five-year review earlier, or more frequently than every five years if needed to ensure the protection of human health and the environment. Appendix G, “History of the Policy for When Five-Year Reviews Were Required,” provides historical information regarding when five-year reviews were due.

1.4.1 What actions first trigger a statutory review?

In keeping with the requirements of CERCLA §121(c) and the NCP, a statutory review is triggered by the initiation of a remedial action that will result in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted

exposure after the remedial action is complete. The earliest remedial action that will leave hazardous substances, pollutants, or contaminants at the site triggers a review, even if it is an interim remedial action.

For the purpose of a five-year review, a remedial action is initiated when response activities begin. The start of a response activity in most cases is the **date of “actual RA [remedial action] onsite construction”** as noted in the Superfund Program Implementation Manual (SPIM).⁶ This date, on which onsite mobilization occurs, is entered into WasteLAN and triggers the statutory five-year review. Therefore, you should have the first five-year review for your site completed and signed within five years of the “actual RA onsite construction date” for the earliest remedial action that will leave hazardous substances, pollutants, or contaminants at the site above levels that allow for unlimited use and unrestricted exposure.

Onsite mobilization does not occur at a site where monitored natural attenuation using existing wells and/or institutional controls are the only response actions. When a review is required by statute, the **“actual RA start” date** in WasteLAN should be used to trigger the review. The “actual RA start” date for a Fund-financed action is the same as the ROD signature date. If monitored natural attenuation or institutional controls are being done by a Potentially Responsible Party (PRP), the “actual RA start” date is the date the PRP provides notice of intent to comply with a Unilateral Administrative Order or the date a judge signs the Consent Decree. Please refer to the SPIM for further information on the definition of “actual RA start” for a PRP-lead action.

1.4.2 What actions first trigger a policy review?

A policy review is triggered by the **date of construction completion** at a site. The date of construction completion is set by Headquarters and is usually the signature date of the Preliminary Close Out Report (PCOR) or the signature date of the Final Close Out Report (FCOR) for sites which do not have a PCOR. The FCOR date also triggers five-year reviews at some NPL removal-only sites.

1.4.3 When is the next five-year review due?

Subsequent five-year reviews should be signed no later than five years after the signature date of the previous five-year review.

1.5 How do five-year review policies apply to a site with multiple operable units?

Five-year reviews should address all operable units (OUs) and remedial actions for which there is a ROD or Action Memorandum. Generally, one party should coordinate the five-year review at any site where there are multiple lead agencies.

1.5.1 What action triggers the review of a site with multiple operable units?

An entire site is subject to a statutory review if any one of its remedial actions is subject to a statutory review. The triggering action for a statutory review at a site with multiple OUs is the initiation of a remedial action at the first OU where hazardous substances, pollutants, or contaminants will remain above levels allowing for unlimited use and unrestricted exposure after completion of the remedial action.

As always, construction completion is the triggering action for a site where all of the remedial actions are subject to a policy review.

1.5.2 May I conduct separate five-year reviews for different areas of a large, complex site?

At a few very large and complex sites, individual OUs or groups of OUs are treated as separate sites throughout the remedial process. Under these circumstances, Regions have the option to conduct a separate five-year review for each area. Generally, such a site has been divided so that remedial actions for different areas of the site are selected in separate RODs, and these different RODs address sources that are geographically separated and pose different remedial problems.

Remedial actions within each area trigger the respective reviews. Following construction completion for the entire site, Regions may choose to combine the separate reviews of different areas into a single five-year review. However, no area should be reviewed later than five years after its previous review.

If you do conduct separate five-year reviews, each five-year review report should include an explanation of this approach, a description of which areas are covered by the five-year review report, and a brief synopsis of the remedial activities and the status of five-year reviews for other areas.

1.6 How should five-year reviews be prioritized?

In planning for five-year reviews, each Region should generally prioritize sites as follows:

- **First** – all sites where reviews are required by statute
- **Second** – reviews conducted as a matter of policy at pre-SARA sites where no five-year review has been conducted
- **Third** – all remaining sites subject to policy reviews

Regions should complete statutory reviews first. Second, Regions should conduct any reviews needed at those pre-SARA sites where no five-year review has been conducted. After completing these reviews, Regions should prioritize policy reviews at those sites where the potential for an unseen release is greatest, i.e., those sites with little or no lead agency presence onsite. However, Regions have the discretion to prioritize reviews based on protectiveness concerns or other critical factors as they deem necessary.

1.7 When do I need to include recommendations in my report?

If necessary, your five-year review report should include descriptions of follow-up actions needed to achieve, or to continue to ensure, protectiveness. At the Region's discretion, the report may also include recommendations addressing the implementation and maintenance of the remedy and coordination with other authorities. Along with these recommendations, your report should list a timetable for performing the actions, the parties responsible for implementation, and the agencies with oversight authority.

If you believe that cleanup levels or remedial action objectives cannot be achieved through the remedial action, your recommendations may suggest the type of decision process (e.g., ROD, ROD Amendment, Explanation of Significant Differences (ESD)) needed to evaluate or make changes to the remedy, cleanup levels, or remedial action objectives.

1.8 How do I submit a five-year review report?

A report prepared by EPA is complete when it is signed by an EPA Regional Administrator or his/her designee. As soon as the five-year report is complete, the Region, through either the Remedial Project Manager (RPM) or the Regional Five-Year Review Coordinator, should submit one copy of the report to the Headquarters Five-Year Review Coordinator. You should prepare a brief summary of the results of the five-year review and

distribute it to the community. You should place a copy of the report and the summary in each of the site information repositories.

1.8.1 How is a State or Indian Tribe-lead report reviewed and submitted?

A State or Indian Tribe that conducts a five-year review should submit the report to the Region for a review of technical adequacy, accuracy, and consistency with this guidance. The Regional Administrator or his/her designee should issue a memorandum either concurring with the report findings or documenting the Region's determinations. For instance, if a State or Tribe provides protectiveness statements in its five-year review report, the Region can choose whether to concur or to include its own protectiveness statements. After the memorandum is signed, a copy of the report with the memorandum attached should be forwarded to the Headquarters Five-Year Review Coordinator.

1.8.2 How is a Federal agency-lead report reviewed and submitted?

A Federal agency or department that conducts a five-year review should submit the report to the Region for review pursuant to the terms of the Federal Facility Agreement. The Region should review the report for technical adequacy, accuracy, and consistency with this guidance. The Regional Administrator or his/her designee should issue a memorandum either concurring with the report findings or documenting reasons for nonconurrence. A copy of the report with the memorandum attached should then be forwarded to the Headquarters Five-Year Review Coordinator.

In some cases, you may not have had substantive involvement at the site, in the five-year review site inspection, or in the development of the five-year review report or protectiveness statements. In such cases, your Region should determine whether to rely solely on the information presented by the other Federal agency without any independent verification. When the Region relies solely on the representations of another Federal agency, the Regional Administrator or his/her designee should note this in the memorandum. It is important to consider who signed the five-year review at the other Federal agency. EPA expects that a five-year review will generally be signed by the other Federal agency at the senior management level.

1.9 What data should I enter into WasteLAN?

You are currently responsible for entering four dates into WasteLAN: the planned and actual start dates for each five-year review, and the planned and actual completion dates for each five-year review. The planned completion date of an initial five-year review is five years from the date of the triggering action: the date of "actual RA onsite construction" or the "actual RA start" date as stated in WasteLAN for a statutory site, or the date of construction completion for a policy site. The planned completion date of a subsequent five-year review is five years from the

signature date of the previous five-year review. The actual completion date of a five-year review is the date the Regional Administrator or his/her designee signs the five-year review report. The action name for entering the data in WasteLAN is “Five-Year Remedy Assessment.”

1.10 How should Regions communicate the status of five-year reviews and the implementation of follow-up actions?

To assist with the monitoring and management of five-year reviews, Regions should submit a summary report of five-year review status information to Headquarters within six weeks after the end of each fiscal year. This annual report should be signed by the Regional Administrator or his/her designee, and should include the following:

- A list of reviews completed, noting the signature date and either a statutory or policy designation for each review, along with the total number of statutory and policy reviews completed
- The protectiveness status from each completed review
- A list of reviews that are overdue, noting their expected completion date and either a statutory or policy designation, along with the total number of statutory and policy reviews that are overdue
- A list of sites where follow-up actions needed to achieve protectiveness—as noted in five-year review reports from the fiscal year just ending and all previous fiscal years—are not completed, along with the status of each of those actions

In addition, for each site where you determined that a remedy was not protective, you should provide an addendum to the report when all of the follow-up actions have been implemented and the remedy is considered protective. Your addendum should reiterate the recommendations and accompanying milestones from your five-year review report. For each recommendation, you should explain what actions were taken, the date they were completed, and how they contribute to the protectiveness of the remedy. Finally, in your addendum, you should provide a revised protectiveness determination. The Regional Administrator or his/her designee should sign the addendum and submit it to Headquarters after the site has attained protective status.

1.11 Can five-year reviews be discontinued?

There is no provision for the discontinuation of statutory reviews. However, policy reviews of post-SARA remedial actions may be discontinued when no hazardous substances,

pollutants, or contaminants remain at a site above levels that allow for unlimited use and unrestricted exposure. Regions should discontinue these reviews only after a five-year review report documents that the contaminants of concern are reported at acceptable levels based on an appropriate period of monitoring.

Regions may also discontinue policy reviews at other sites after at least one review is completed. Each Region determines the need for subsequent policy reviews for sites that do not have a post-SARA remedial action on a site-by-site basis.

Upon determining that five-year reviews are no longer necessary, your five-year review report should state the basis for discontinuing the review along with the determination that the remedy is protective. If a ROD states that a five-year review will be performed, but prior to conducting the first review the Region determines that no review is required, this finding should be recorded in a major document subject to public comment, such as a Proposed Plan or a Notice of Intent to Delete. You should submit a memorandum, signed by your Regional Administrator or his/her designee, to the Headquarters Five-Year Review Coordinator providing the reason for not conducting five-year reviews and citing the document in which this finding was made.

Notes:

1. The general response authority of CERCLA §104 applies to both removal and remedial actions. However, CERCLA §104(c)(4) states that if a remedial action is selected, the President must follow the requirements outlined in CERCLA §121 (Cleanup Standards). This includes a review of the remedial action every five years when applicable. See Appendix G for the text of CERCLA §104(c)(4). Also see 40 CFR 300.400 (Subpart E).
2. SARA became effective the date it was passed (October 17, 1986). See Pub. L. 96-510, Title I, §121, as added Oct. 17, 1986, Pub. L. 99-499, Title I, §121(a), Oct. 17, 1986, 100 Stat. 1672.
3. You may conduct a five-year review at a site where there is not a ROD (e.g., an NPL removal-only site). This guidance is written in terms of “remedies,” “remedial actions,” and “remedial action objectives.” For a site without a ROD, you should adapt the policy and methodology described in this guidance to accommodate site-specific circumstances.
4. In 1991, EPA clarified its policy on whether a site deleted from the NPL is subject to a five-year review. See “Notice of Policy Change,” 56 FR 66601 (December 24, 1991).
5. The memorandum “Coordination Between RCRA Corrective Action and Closure and CERCLA Site Activities” was issued by Steven A. Herman, Assistant Administrator, Office of Enforcement and Compliance Assurance (September 24, 1996).
6. The WasteLAN action that corresponds to the initiation of response activities depends on the type of response. See the 1999/2000 SPIM, Office of Solid Waste and Emergency Response (OSWER) Directive 9200.3-14-E. Further explanation is provided in Appendix B of the SPIM, Section q, “Start of Response Actions/Activities.”

2.0 Roles and Responsibilities for EPA, States, Indian Tribes, and Other Federal Agencies

This chapter discusses the roles and responsibilities that EPA and other agencies have in conducting five-year reviews. It is organized by response action lead and covers roles for conducting reviews, EPA's oversight responsibilities, and funding. The chapter also highlights specific aspects of agreements, such as Consent Decrees and Federal Facility Agreements, related to the conduct of five-year reviews and the follow-up to review recommendations.

2.1 What are the roles of lead and support agencies?

The determination of lead and support agencies for five-year reviews is generally the same as that established for the response action. Lead agencies have the primary responsibility for coordinating the response actions and five-year reviews. Either EPA, a State, an Indian Tribe, or another Federal agency (e.g., the Department of Defense for sites on military bases) can serve as a lead agency.

Sites subject to review can be divided into several categories, according to who leads the response action at the site. EPA's role varies according to the governing authority and site-specific agreements. In most cases, EPA is ultimately responsible for conducting reviews. However, EPA can often delegate review activities. For instance, EPA may authorize a State or Indian Tribe to conduct a five-year review. In some cases, such as for Department of Defense NPL sites, EPA is not responsible for conducting five-year reviews. When it has delegated review activities or is not responsible for conducting reviews, EPA will often issue a finding of concurrence or non-concurrence as a separate memorandum, attached to the five-year review report. EPA's responsibilities and those of other agencies, for conducting and concurring with reviews is generally specified in agreements between the agencies. These relationships are explained further in this chapter. This chapter also covers the types of assistance that PRPs may provide during five-year reviews.

Exhibit 2-1 provides an overview of the typical roles of different parties for each type of response action.

Exhibit 2-1: Typical Roles in the Five-Year Review Process*

If the response action is...	at...	under...	then the review is the responsibility of...	with funding by...	and concurrence by...
Fund-lead	an NPL site	CERCLA §121	the EPA Region	Superfund	N/A
PRP-lead	an NPL site	CERCLA §121 along with a Consent Decree or other settlement document	the EPA Region, who may authorize PRPs to provide support for five-year reviews	PRPs	N/A
State or Tribe-lead	an NPL site	CERCLA §121 along with a Superfund State Contract or other document	the EPA Region, who may authorize a State or Indian Tribe to conduct five-year reviews	Superfund	the EPA Region
Other Federal agency-lead	a Department of Defense (DoD), Department of Energy (DOE), or United States Coast Guard (USCG) NPL site	CERCLA §§120 and 121, Executive Order 12580, along with a Federal Facility Agreement (FFA)	DoD, DOE, or USCG	DoD, DOE, or USCG	the EPA Region
Other Federal agency-lead	an NPL site not led by DoD, DOE, or USCG (e.g., Department of Agriculture, Department of Interior)	CERCLA §§120 and 121, Executive Order 12580, along with an FFA	the EPA Region, who may authorize a Federal agency or department to conduct five-year reviews	the respective Federal agency or department	the EPA Region
Other Federal agency-lead	a non-NPL site	CERCLA §§120 and 121, Executive Order 12580, along with an FFA	the respective Federal agency or department	the respective Federal agency or department	the EPA Region on a site-specific basis

* The site scenarios presented in the exhibit are not all inclusive. Regions should determine the respective roles in the five-year review process when other circumstances exist.

2.2 Who conducts the review at a Fund-lead NPL site?

EPA is responsible for conducting five-year reviews at Fund-lead NPL sites. Regions may choose to conduct a review with Regional staff (along with representatives of other agencies, and others, when appropriate). For assistance in conducting a review, Regions may acquire the services of a remedial action contractor to perform studies, conduct investigations, and/or produce a draft report. Regions may also establish agreements with other agencies (e.g., the U.S. Army Corps of Engineers) to provide information in support of a review.¹ In all cases, Regions should ensure the quality and completeness of review activities. The final protectiveness determination is solely a Region's responsibility.

2.3 What if a site is a PRP-lead NPL site?

EPA is ultimately responsible for conducting five-year reviews at PRP-lead NPL sites and will not delegate reviews to PRPs or to PRP-hired contractors. If a State or Indian Tribe is the lead agency for a PRP-lead NPL site, the State or Indian Tribe generally should conduct the five-year review and we should serve in a concurrence role. PRPs should not conduct five-year reviews because they have an inherent conflict of interest in evaluating remedy performance and determining protectiveness. Rather, **the lead agency is responsible for the preparation and content of the five-year review report.**

Although PRPs may not conduct five-year reviews, under CERCLA §104 lead agencies may direct qualified and otherwise capable PRPs to conduct approved studies or investigations in support of five-year reviews. However, a lead agency, not a PRP, should conduct a site inspection if it is required (see Chapter 3, Section 3.3.3). If PRP support is used, the lead agency should review and verify to the greatest extent possible data analyses, and other information provided by the PRP.

Lead agencies should request that PRPs provide accurate O&M cost data regardless of a PRPs other involvement in the five-year review process. O&M funding and actual costs are measures of the resources and level of effort that PRPs are expending to maintain the remedy. O&M cost trends can also reveal problems with remedy performance that may not otherwise be apparent. A PRP should provide the lead agency with a breakdown of the annual O&M costs for the period under review. In addition, PRPs should provide projected O&M budgets for the subsequent five-year period.

Lead agencies can seek to recover costs related to five-year reviews at PRP-lead sites. Settlement agreements should provide for cost reimbursement directly to the agency undertaking five-year reviews (including States and Tribes, if appropriate) whenever possible. Where such language is not in a settlement agreement, CERCLA §107 allows the cost of five-year reviews to be recovered through a cost recovery action.

To ensure that remedies remain protective, EPA also includes provisions within enforcement settlement documents whereby PRPs can be compelled to conduct studies and investigations and to perform additional response actions. The following subsections discuss how Consent Decrees (CDS) can address PRPs' responsibility to conduct studies and investigations; options available to EPA when PRPs are not required to provide support; and how EPA can gain access to site property.

2.3.1 What provisions can be included in a Consent Decree?

EPA's model CERCLA Remedial Design/Remedial Action (RD/RA) Consent Decree² requires settling PRPs, upon request, to perform studies and investigations necessary to facilitate our review of the remedy. Settling PRPs may also be required to conduct further response actions that EPA determines necessary to ensure that the remedy remains protective. Generally, the PRPs' performance of these obligations may be enforced by a court, either through the assessment of stipulated (or statutory) penalties or the issuance of a court order. Exhibit 2-2 provides highlights of key provisions of the model RD/RA CD.

Exhibit 2-2: Model Consent Decree Provisions Concerning Five-Year Reviews

Section VII (remedy review) of EPA's model RD/RA CD requires PRPs to do the following:

- Conduct any studies and investigations we request in order to permit us to conduct five-year reviews (referred to as periodic reviews in the Model CD) as required by CERCLA §121(c), to determine whether the remedy remains protective.
- Undertake further response actions that EPA determines necessary on the basis of five-year reviews to the extent that EPA can satisfy "reopener" conditions specified in the Model CD. Reopeners are CD provisions that preserve EPA's right to compel the PRP to undertake response actions in addition to those agreed to in the settlement documents. Reopeners are triggered when conditions at the site, unknown to EPA when the ROD was signed, are discovered, or new information is received and such information or conditions indicate that the remedy is no longer protective of human health and the environment.

The model RD/RA CD also includes dispute resolution provisions. As a first step, PRPs may enter informal negotiations if they disagree that the CD obligates them to comply with requests for assistance with five-year reviews. If the dispute cannot be resolved through informal means, a formal dispute resolution process is specified in the CD. PRPs must outline reasons for invoking the dispute resolution provisions in a statement of position. EPA must also justify its decision in a statement of position.

2.3.2 What if a Consent Decree does not contain certain provisions?

In some cases, PRPs have entered into RD/RA CDS that do not require them to undertake further response actions determined to be necessary on the basis of EPA's review of the remedy. In these cases, there are several ways in which EPA can seek to obtain the PRPs' agreement or compel them to undertake further response actions. EPA can do the following:

- Modify the Statement of Work to require the PRPs to implement the modified work requirements (permitted so long as the modification is consistent with the scope of the remedy selected in the ROD)
- Re-negotiate the CD to include a requirement that the PRPs perform further response actions
- Sue the PRPs to compel them to undertake further response actions (or bear the cost of such work) or order the PRPs to undertake such actions—depending on the scope of the covenant not to sue, EPA may have to first establish that it has satisfied reopener conditions

2.3.3 How can EPA gain access to site property?

You may need to gain access to PRP property to conduct a five-year review. The model CD contains language requiring PRPs to

- Provide EPA with access to properties controlled by a PRP in order to implement the requirements of the CD;
- Use “best efforts” (including payment of reasonable sums of money) to obtain access to properties they do not own, if necessary, to implement the requirements contained in the CD.

In the event that a PRP's “best efforts” to obtain access are not successful, EPA may invoke the authority of CERCLA §104(e) to obtain access from the landowner for EPA staff and its authorized representatives.

2.4 What if site activities are led by a State or Indian Tribe?

CERCLA §104(d)(1) and 40 CFR 300 (Subpart F) set out requirements for State and Indian Tribe involvement in remedial and enforcement response. Pursuant to these provisions, a State or Indian Tribe can act as lead agency in carrying out five-year reviews. However, EPA is ultimately responsible for the protectiveness determination at any site where CERCLA authority

or funding is used. **At such a site, if a State or Tribe provides EPA with a five-year review report that includes protectiveness statements, EPA can choose to concur with the statements or to make its own determinations.**

States and Tribes may conduct five-year reviews at sites within their jurisdiction. Roles and responsibilities should be documented in existing Superfund Memoranda of Agreement (SMOAs), Superfund State Contracts (SSCs) or Cooperative Agreements (CAs). A SMOA is a general non-site-specific agreement that define roles and interactions in conducting a response action. An SSC is used to identify EPA and State or Tribal roles and responsibilities at Fund-financed remedial actions. The SSC also documents assurances by a State that are required under CERCLA §104. CAs provide the mechanism to transfer Trust Fund monies to a State or Tribe for response activities. If no SMOA, SSC, or CA is available, a letter of agreement may be written to define EPA roles and responsibilities along with those of a State or Tribe.³

2.5 What if site activities are led by another Federal agency?

CERCLA §§104, 120, and 121 specifically identify functions and responsibilities vested in the President for directing response efforts and coordinating all other efforts at the scene of a discharge or release on or from Federally-owned property (or vessels). The President, in Executive Order (EO) 12580, as amended, delegates some of these functions and responsibilities to the respective Federal departments and agencies for Federally-owned facilities over which those lead agencies have jurisdiction, custody, or control.

More specifically, at other Federal agency-lead sites, CERCLA §§104, 120, EO 12580, and the NCP establish the respective Federal department or agency roles and responsibilities for remedial investigations, the selection of remedies, and conducting five-year reviews. EO 12580 §§2(d), (f), and (g) give the authority to conduct five-year reviews at NPL sites to the Department of Defense (DoD), the Department of Energy (DOE), the United States Coast Guard (USCG), and EPA, respectively. EPA may also authorize Federal departments or agencies (other than DoD, DOE, or USCG) to conduct five-year reviews at Federal facility NPL sites by entering into site-specific Federal Facility Agreements (FFAs), sometimes called Interagency Agreements (IAGs). For all NPL Federal facility sites, EPA retains final responsibility to assure that five-year reviews conducted by any other Federal lead agency adequately address the protectiveness of remedies (which may ultimately be resolved on a site-specific basis through formal dispute resolution procedures, typically established in FFAs). For non-NPL Federal facility sites, EO 12580 gives the responsibility to conduct five-year reviews to the respective Federal agency or department that has jurisdiction, custody, or control. Exhibit 2-3 provides an overview of the relevant EO 12580 sections and their applicability.

Exhibit 2-3: Federal Responsibilities under Executive Order 12580

In EO 12580 section(s) ...	the President delegates to...	certain functions and responsibilities identified in CERCLA section(s)...	and those functions and responsibilities at Federal facilities generally pertain to ...
§2(b)	EPA (in consultation with the National Response Team)	§104(e)(7)(C) and §121(f)	promulgation of regulations and guidelines (including five-year reviews), and assuring substantial and meaningful State involvement (in initiation, development, and selection of remedial actions to be undertaken by the State).
§2(d)	DoD, DOE (subject to procedures described in CERCLA §120)	§104(a), §104(b), §104(c)(4),	and §121 taking (NPL/non-NPL) response actions, selecting (NPL/non-NPL) remedial actions, conducting (NPL/non-NPL) five-year reviews.
§2(e)	Federal Departments/ Agencies (for: - remedial actions - non-emergency removal actions)	§104(a), §104(b), §104(c)(4),	and §121 taking (NPL/non-NPL) response actions, selecting (non-NPL) remedial actions, conducting (non-NPL) five-year reviews.
§2(f)	USCG (in Coastal Zones, Great Lakes, Ports and Harbors)	§104(a), §104(b), §104(c)(4),	and §121 taking (NPL/non-NPL) response actions, selecting (NPL/non-NPL) remedial actions, conducting (NPL/non-NPL) five-year reviews.
§2(g),(h)	EPA (subject to the above)	§104(a), §104(b), §104(c)(4),	and §121 selecting NPL remedial actions, conducting five-year reviews (at Federal facilities other than DoD, DOE, Coast Guard NPL sites).*

* CERCLA §120(e)(2) stipulates that Federal departments/agencies must enter into IAGs (frequently referred to as FFAs) with EPA (and participating States) for sites listed on the NPL. In most cases, the parties to such FFAs do (or should) specify in more detail the procedures to be followed with respect to selecting remedial actions and conducting five-year reviews, and as such EPA may permit other Federal departments or agencies to conduct five-year reviews. However, FFAs cannot re-delegate EPA's ultimate responsibility to assure that such reviews are completed either by EPA or the appropriate department or agency.

Federal agencies may not adopt or utilize guidelines which are inconsistent with this five-year review guidance or other EPA guidance as specified in CERCLA §120(a)(2).

The following subsections detail responsibilities for conducting five-year reviews at sites led by other Federal agencies.

2.5.1 What is the EPA oversight role at other Federal agency NPL sites?

CERCLA §120 and EO 12580 provide the basis for EPA's oversight role at other Federal agency NPL sites.⁴ This role includes

- Assisting in the determination of cleanup remedies or potentially selecting the remedies;
- Concurring that there is compliance with all relevant guidance and policies that EPA determines are appropriate;
- Ensuring compliance with signed FFAs;
- Determining that decisions protect human health and the environment and are technically sound.

EPA remains responsible for ensuring that the remedy is protective of human health and the environment. EPA has the final responsibility to review and comment on any Federal agency recommendations contained in the five-year review report to ensure protection of human health and the environment, consistent with EPA's statutory and regulatory responsibilities. In rare circumstances, EPA may undertake further investigations. EPA may need to conduct an independent five-year review, or use appropriate Federal facility enforcement mechanisms to require studies that support EPA's evaluation of the five-year review. However, **in most cases where EPA is not the lead agency, it will maintain a limited oversight and concurrence role.** EPA should participate throughout the five-year review process, as appropriate, to ensure the adequacy, completeness, and technical accuracy of five-year reviews.

Roles and responsibilities at each site are generally specified in an FFA. Where the roles for conducting five-year reviews are not specified in an FFA (either the FFA has not been signed, or it is silent with respect to five-year reviews), then the parties should rely on this guidance. Five-year review requirements should be identified early in the FFA process, so that each Federal agency or department has clearly defined roles and responsibilities for implementing CERCLA §121(c). However, FFAs cannot re-delegate EPA's ultimate responsibility to assure that such reviews are completed either by EPA or the Federal department or agency. Exhibit 2-4 describes the topics addressed in an FFA.

Exhibit 2-4: Federal Facility Agreements

FFAs contain procedures for the submission and review of documents, schedules of cleanup activities, and provisions for dispute resolution. Regions should examine FFAs to clarify

- Roles, responsibilities, and milestones;
- Arrangements for long-term operation and facility maintenance;
- Opportunities for public involvement.

CERCLA requires that EPA must negotiate an FFA (“IAG” in the statute) with the relevant Federal agency or department six months after the Remedial Investigation/Feasibility Study (RI/FS) is completed.⁵ States may be signatories to the FFA and must be included in the decision-making process at NPL Federal facility sites. Whenever a Federal facility is located on Tribal lands, the appropriate Tribal government should be involved.

EPA considers five-year reviews to be primary documents requiring an enforceable schedule within the framework of the FFA. Where EPA has entered into an FFA, the agreement should include all site-specific five-year review requirements, such as provisions for reviews, public participation, and correcting deficiencies.

2.5.2 What is EPA’s role at a DoD, DOE, or USCG NPL site?

Executive Order 12580 establishes the requirements for conducting five-year reviews at NPL sites controlled by DoD, DOE, and USCG. EO 12580 §2(d) delegates the authority in CERCLA §121 for the selection of remedial actions and conducting five-year reviews to the Secretaries of Defense and Energy. The delegated authority extends to a release or threatened release where either the release is on, or the sole source of the release is from, any facility or vessel under the jurisdiction, custody, or control of DoD and DOE, including vessels bare-boat chartered and operated. EO 12580 §2(f) delegates the responsibility to conduct five-year reviews to USCG with respect to any release or threatened release involving the coastal zone, Great Lakes waters, ports, or harbors.

Thus, EPA is not responsible for the conduct of reviews at these sites. However, under CERCLA §120, EPA’s final remedy selection authority encompasses response actions at NPL sites under the jurisdiction, custody, or control of all Federal agencies or departments. Therefore, **EPA reviews five-year review reports for any DoD, DOE, and USCG site on the NPL, and issues a finding of concurrence or non-concurrence.**

2.5.3 What is EPA's role at an NPL site under the jurisdiction of another Federal agency or department?

For NPL sites under the jurisdiction of a Federal agency or department other than DoD, DOE, or USCG (e.g., Department of Interior, Department of Agriculture), EPA is responsible for conducting five-year reviews. EO 12580 §2(g) delegates to EPA the authorities in CERCLA §§121(a) and (c) for the selection of remedial actions and the conduct of five-year reviews at these NPL Federal facility sites.

EPA may authorize the conduct of reviews or require other parties to perform supporting analyses through FFAs or IAGs with another Federal agency or department. Federal agencies and departments are responsible for funding five-year reviews at Federal facility sites under their jurisdiction, custody, or control.⁶

Where EPA and the other pertinent agency or department have not entered into an FFA that indicates which agency should perform the review, the responsibility for conducting the review remains with EPA. In such cases, Federal agencies or departments, other than DoD, DOE, or USCG, should submit draft certifications of protectiveness, along with supporting information collected during the review, to the appropriate Regional office.

2.5.4 What is EPA's role at a non-NPL site under the jurisdiction of another Federal agency or department?

EO 12580 §2(e)(1) delegates the authority in CERCLA §121 to the heads of executive departments and agencies for remedial actions addressing releases or threatened releases that are not on the NPL. Federal agencies and departments should conduct five-year reviews consistent with this guidance at sites not on the NPL where a remedy selected under §121 results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use or unrestricted exposure. It is EPA's expectation that these agencies will also conduct five-year reviews as a matter of policy at sites that would be subject to policy reviews if they were on the NPL. EPA does not have an explicit concurrence role in reviews at non-NPL sites, and may or may not concur on a site-specific basis.

Notes:

1. Regions may also acquire these services for PRP-lead sites.
2. “EPA Model CERCLA RD/RA Consent Decree,” 60 FR 38817 (July 28, 1995).
3. For more information on letters of agreement, see 40 CFR 300.515(a)(2). For more information on SMOAs, SSCs, and CAs, see 40 CFR 35 (Subpart O).
4. In November 1996, the Federal Facilities Restoration and Reuse Office (FFRRO) issued the “Federal Facilities Streamlined Oversight” directive, which reiterates that EPA is responsible for the oversight of Superfund remedial activities at NPL Federal facility sites. States and Indian Tribes, as regulators, may also have an oversight role, but their specific roles and responsibilities are determined by the FFA at each facility. See OSWER Directive 9320.0-75 (November 29, 1996), “Federal Facilities Streamlined Oversight Directive.”
5. CERCLA §120(e)(2) states: “The Administrator shall review the results of each investigation and study conducted as provided in paragraph (1). Within 180 days thereafter, the head of the department, agency, or instrumentality concerned shall enter into an interagency agreement with the Administrator for the expeditious completion by such department, agency, or instrumentality of all necessary remedial action at such facility.” As a result, other Federal agencies are required to enter into site-specific interagency agreements (IAGs or FFAs) with EPA for sites on the NPL. Further, States or Tribes may also be parties to a site-specific FFA. Also, under CERCLA §120, States shall be provided the opportunity to participate in and review Federal facility data and reports.
6. CERCLA §111(e)(3) states: “No money in the Fund shall be available for remedial action, other than action specified in subsection (c) of this section, with respect to federally owned facilities; except that money in the Fund shall be available for the provision of alternative water supplies (including the reimbursement of costs incurred by a municipality) in any case involving groundwater contamination outside the boundaries of a federally owned facility in which the federally owned facility is not the potentially responsible party.”

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3.0 Components of the Five-Year Review Process

This chapter discusses the components of the five-year review process, including how to define the scope, plan the review, collect information, develop conclusions, and write the five-year review report. Chapter 4, “Assessing the Protectiveness of the Remedy,” gives a detailed description of how to assess whether a remedy is protective of human health and the environment.

3.1 What influences the scope of a five-year review?

A five-year review determines whether the remedy at a site is protective of human health and the environment. Where a remedial action is still under construction, a five-year review determines whether immediate threats have been addressed and whether the remedy is expected to be protective when all remedial actions are completed. In addition, a five-year review identifies any deficiencies and recommends steps to correct them. To do this, the technical assessment conducted during a five-year review examines the three questions shown below. Exhibit 3-1 lists the issues you should consider in answering each of the questions.

- **Question A** – Is the remedy functioning as intended by the decision documents?
- **Question B** – Are the assumptions used at the time of remedy selection still valid?
- **Question C** – Has any other information come to light that could call into question the protectiveness of the remedy?

To answer these questions, a five-year review includes several steps. Most reviews include a review of documents, interviews, and a site inspection. Many reviews include a review of newly promulgated standards, and changes in the standards that were identified as applicable or relevant and appropriate requirements (ARARs) at the time of the ROD, to be considered (TBCs) and the factors used to develop site-specific, risk-based levels. This information is reviewed when changes since the time of the ROD may call into question the protectiveness of the remedy. Some reviews also include a recalculation of risk or a risk assessment when necessary to determine whether a remedy protects human health and the environment. When applicable, monitoring and sampling data, and the documentation of operation and maintenance (O&M) are also examined.

The scope of a five-year review is site-specific. The following items are examples of site-specific characteristics that could influence the scope of your five-year review:

- A specific statement made in the previous five-year review report or in the ROD about the scope of the next five-year review

Exhibit 3-1: Three Questions Used to Determine Whether a Remedy is Protective

When you ask...	then you should consider...
<p>Question A: Is the remedy functioning as intended by the decision documents?</p>	<p>S whether performance standards are (or are likely to be) met</p> <p>S whether there are problems with the remedy that could lead to remedy failure or suggest protectiveness is at risk</p> <p>S whether the access (e.g., fencing and/or security guards) and institutional controls needed at the particular stage of the remediation are in place and prevent exposure</p> <p>S whether other actions (e.g., removals) necessary to ensure that immediate threats have been addressed are complete</p> <p>S whether operating procedures, as implemented, will maintain the effectiveness of response actions</p>
<p>Question B: Are the assumptions used at the time of remedy selection still valid?</p>	<p>S whether there are changes in the standards identified as ARARs in the ROD, newly promulgated standards, and/or changes in TBCs that could call into question the protectiveness of the remedy</p> <p>S whether there are changes in land use or expected land use on or near the site</p> <p>S whether new human health or ecological exposure pathways or receptors have been identified</p> <p>S whether new contaminants or contaminant sources have been identified</p> <p>S whether there are unanticipated toxic byproducts of the remedy not previously addressed by the decision documents</p> <p>S whether there are changes in the physical site conditions</p> <p>S whether there are changes in the toxicity factors for contaminants of concern</p> <p>S whether there are changes in the standardized risk assessment methodologies</p>
<p>Question C: Has any other information come to light that could call into question the protectiveness of the remedy?</p>	<p>S whether ecological risks have been adequately addressed at the site, and/or there is a plan to address them through a future action</p> <p>S whether the site is/was subject to natural disasters, such as a 100-year flood</p>

- Site size, the number of OUs, the number of contaminants addressed by the remedy, and other factors related to the site’s complexity
- The remedy’s vulnerability to stress, wear, or other physical deterioration
- The level of uncertainty about the effectiveness of the remedial technology
- The length of time since construction of the remedy
- Community issues or concerns

Your examination of the remedy should be tailored to the stage of implementation of each remedial action:

- 1) Remedial actions under construction
- 2) Remedial actions where construction is complete, but cleanup goals have not been achieved yet
- 3) Completed remedial actions where cleanup goals have been achieved

In general, the assessment of remedial actions under construction is narrower in scope than the assessment of remedial actions where construction has been completed. In addition, although a five-year review does not evaluate remedial actions that have not begun, you should address them in the five-year review report if a five-year review is already underway elsewhere at the site. In such a case, you should include a discussion of the status of remedial actions that have not begun and the actions taken to address any immediate threats in the five-year review report. See Chapter 4 for a discussion of the appropriate review steps for each stage of remedial action implementation.

EPA has eliminated the system of review levels presented in previous five-year review directives. Under this guidance, the assessment of operating and completed remedial actions under construction corresponds to the “Level 1a” review. The assessment of operating and completed remedial actions corresponds to the former “Level 1” review. The “Level 2” and “Level 3” reviews in earlier directives simply reflected the need for a risk calculation or a risk assessment. Under this guidance, you should conduct risk calculations and risk assessments when needed, regardless of the implementation stage of a remedial action.

3.2 How should I plan for a five-year review?

In planning a review, you generally establish a review team, develop a review schedule, and notify the community.

3.2.1 How should I establish a review team?

At many sites, a team approach to the five-year review is necessary to ensure a high quality, thorough review. This is often true for complex sites, for example, those with several OUs, a history of remedy performance problems, and/or with a high level of community concern. For a less complicated site, the five-year review process may be straightforward and require only limited support. You should select the members of the five-year review team based on the scope of the review that the site requires. Exhibit 3-2 provides examples of potential team members for an EPA-lead five-year review.

Exhibit 3-2: Potential Members for Your Five-Year Review Team

- Remedial Project Manager
- Community Involvement Coordinator
- State regulatory agency representatives
- Tribal agency representatives
- Other Federal agency representatives (e.g., U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, Agency for Toxic Substances and Disease Registry, U.S. Geological Survey)
- Technical Experts
 - Construction Representative/Geotechnical Engineer - landfill design and construction
 - Process Engineer - groundwater/leachate collection and treatment
 - Civil Engineer - structural and general site conditions
 - Hydrogeologist - aquifer characterization
 - Chemist - analytical results
 - Risk Assessor - risk assessment
 - Biologist - wetlands and wildlife impacts
 - Office of Regional Counsel Representative - institutional controls, enforcement documents

At sites with PRP involvement, it is important that EPA, the State, or the Indian Tribe lead five-year reviews. PRPs and contractors hired by PRPs have an inherent conflict of interest in conducting five-year reviews. Thus, the lead agency should develop the scope and design of a five-year review. The lead agency may then request that the PRP conduct a study or investigation to support the review. Lead agencies, with EPA oversight as applicable, are responsible for assuring the accuracy and completeness of the methods and data used in five-year reviews. See Chapter 2, Section 2.3 for further information on PRP involvement in the five-year review process.

For reviews at another Federal agency-lead sites, FFAs specify EPA's role and the roles of the other Federal agencies. However, cross-agency cooperation, including joint teams, is encouraged when we and the other Federal agency believe it would be beneficial.

Once you identify your team members, you should clearly define their roles. You may provide or assist team members in obtaining pertinent background information and in determining the scope of your five-year review. Communication among team members is critical to ensure that everyone remains informed throughout the entire review process.

3.2.2 How should I develop a review schedule?

Along with establishing a review team, you should work with your team members to develop a review schedule. The review schedule should include the tasks associated with your five-year review and the team members assigned to each task (e.g., site inspection, review of ARARs).

3.2.3 How should I keep the community informed?

You should begin working with your Regional Community Involvement Coordinator (CIC) at the planning stage of your five-year review. Because EPA uses five-year reviews to communicate the status and protectiveness of a remedy; you should notify the community at the outset of the five-year review process. Your notification should state

- That a review will be conducted;
- The type of review (statutory or policy);
- How the community can contribute;
- The location of the five-year review report when completed.

Your CIC can recommend appropriate methods of communication (e.g., public notices, fact sheets) for notifying the public.

After you complete the review and prepare the report, you should notify the community and make a brief summary of the report available. The summary should include a short description of the remedial action, any deficiencies, recommendations and follow-up actions that are directly related to protectiveness of the remedy, and the determination(s) of whether the remedy is or is expected to be protective of human health and the environment. You should also provide the location of the site information repository and/or where a copy of the report can be obtained, and provide the date of the next five-year review or notify the community when five-year reviews will no longer be necessary.

You should also place the five-year review report in each site information repository. When considering additional means of informing the community, you may want to consult with the CIC. The five-year review may be the last time that EPA interacts with the public with respect to a particular site until the next five-year review. Therefore, you should ensure that the results of your five-year review are well communicated. See Appendix F, “Community Involvement,” for further information on community involvement in the five-year review context.

3.3 What information do I need to collect to perform a five-year review?

Information collection is the primary activity of a five-year review. You will generally perform three basic tasks: a document review, interviews, and a site inspection. In addition, you may need to conduct supplemental sampling or other data collection if existing data is not sufficient. Each activity is discussed below.

3.3.1 What documents should I review?

The document review is the foundation of your five-year review. It helps you determine the full scope of the remedy, its goals, and its current status. For example, if construction is complete at a site or an OU, you should review documents to determine the following:

- Remedial action objectives and cleanup levels specified in the ROD and other decision documents
- Remedial actions and their design
- Any changes that affect the validity of the assumptions underlying cleanup levels (e.g., standards identified as ARARs, contaminant characteristics, and potential exposure)
- Status of the implementation of the remedy and O&M
- Status of the implementation and the adequacy of the enforcement of institutional controls
- Effectiveness of the remedy in meeting remedial action objectives

For remedial actions under construction, you can usually scale back the document review, as described in Chapter 4, Section 4.2. Since the remedy has not been built, you are usually required only to review the history of the remedy, goals of the remedy, the Health and Safety Plan (HASP) and/or Contingency Plan, and other measures to prevent exposure.

See Appendix C, “Document Review” for further information on reviewing documents as part of a five-year review.

3.3.2 How should I conduct interviews?

Interviews are conducted to identify successes and problems with remedy implementation and to develop an understanding of your site’s status. The following is a list of potential interviewees:

- The site manager
- O&M staff
- Other site staff
- Local regulatory authorities and response agencies

- Organizations implementing or overseeing institutional controls
- Community action groups or associations
- Residents/businesses located near the site
- Any other pertinent organizations or individuals

In planning interviews you should assess what the interviews need to cover and in how much detail, and who can best address each issue. You should design interviews to collect additional information on the following subjects, as needed to supplement other sources of information:

- The implementation and functioning of the remedy
- The integrity of access restrictions
- The implementation and enforcement of institutional controls
- Potential changes in land and resource use
- Early indicators of potential remedy failure
- Any concerns of site neighbors

Each party does not need to be interviewed at every site. The scope of interview questions will vary depending on the party being interviewed. For example, you will typically ask a resident questions that are general in nature, but you are likely to ask the site O&M contractor detailed questions concerning remedy function.

You may conduct interviews personally, by telephone, or by a mailed survey. The type of interview you choose to conduct should depend on site complexity and on the individual to be interviewed. For example, if you are conducting a second five-year review of a large site in a mixed use area without an ongoing presence by a lead agency, you may decide to mail a survey to residents and businesses adjacent to the site, conduct phone interviews with selected parties, and personally interview the site manager, local officials, and community organizations. In contrast, if you are conducting a first five-year review of a small site in a rural area with a continuing EPA presence, you may decide that interviews will not improve your understanding of the site. You are responsible for determining the extent and scope of each interview on a site-by-site basis. See Appendix D, "Five-Year Review Interviews," for typical interview topics.

3.3.3 How should I conduct a site inspection?

The site inspection is your opportunity to visually confirm and document the conditions of the site, the remedy, and the surrounding area. It also gives you an opportunity to conduct interviews. **At a PRP-lead site, EPA, the State, or Indian Tribe should always conduct the site inspection.** At a Federal agency site, the agency conducting the five-year review should conduct the site inspection. You may not need to conduct a site inspection if there is an ongoing presence at the site.

Appendix E, “Five-Year Review Site Inspection Checklist,” separates site inspection activities into several tasks:

- Interviews
- Review of documents and records
- Review of system operations/O&M costs¹
- Inspections of access and institutional controls
- Inspections of containment and groundwater/surface water remedies
- Inspection of general site conditions
- Overall observations

This checklist serves as your guide for planning and documenting the site inspection. Although it only addresses containment, groundwater, and surface water remedies, you should adapt it for the review of other types of remedies.

3.3.4 Are there times when I do not need to conduct interviews or a site inspection?

For a site with an ongoing presence, you may not need to perform interviews or a site inspection. “Ongoing presence” means that either EPA, the State, Tribe, or another Federal agency is the lead agency for the site and that the lead agency is involved in and knowledgeable of site activities, issues, concerns, and status. Specifically, there should be regular activity at the site, evidenced by continuing response work that is overseen by the continued presence of the lead agency or regular inspections by the lead agency. Such continuing response work may include a remedial action, a removal, a study or investigation, regular monitoring or sampling, or other regular site activity. For a site without an ongoing presence, you should, at a minimum, conduct interviews with the site manager and local government officials.

When there is no ongoing presence at a site, a five-year review should include a “recent” site inspection. “Recent” means no more than six months prior to the initiation of the review, when older data are not sufficient. You or another Regional representative may combine a site inspection with a visit conducted for some other purpose provided that the results of the visit are documented (e.g., the latest annual site visit).

3.3.5 When is additional data collection necessary?

As part of your document review, you should review sampling and monitoring plans and data. It is usually sufficient to review existing information to determine whether the remedy is meeting remedial action objectives. However, in some cases you may need to conduct additional sampling to document the performance of the remedy adequately. For instance, you may need supplementary sampling to assess whether contaminants have migrated offsite.

3.4 How should I develop the conclusions of my five-year review?

The conclusions of your five-year review will include an identification of remedy deficiencies, recommendations and follow-up actions, and a determination of whether the remedy is or is expected to be protective of human health and the environment. You should arrive at these conclusions by assessing the information collected during the document review, interviews, site inspection, and other activities. Your evaluation should focus on answering the three questions shown in Exhibit 3-1. Please see Chapter 4 for a detailed discussion of how to assess the remedy using these three questions.

3.4.1 How should I identify deficiencies?

You should identify all deficiencies that currently prevent the response action from being protective, or have the potential to do so in the future. You should document all such deficiencies and follow-up actions needed to ensure the proper management of the remedy in your five-year review report. You should also identify early indicators of potential remedy failure. Early indicators may include operating costs that are more extensive than originally anticipated. For instance, excessive replacement of pumps or other equipment may indicate the need to reconsider system design or re-evaluate aquifer conditions. At your discretion you may also make additional recommendations for follow-up actions that do not directly relate to achieving or maintaining the protectiveness of the remedy.

Exhibit 3-3 provides an example of a tabular format that you can use to list deficiencies in your five-year review report. Examples of deficiencies that may be identified in a five-year review report include the following:

- Inadequate access controls

- Improperly implemented response action, including institutional controls
- Inadequate institutional controls
- Response action not expected to achieve cleanup levels
- Monitoring not completed in a timely manner
- Inadequate maintenance of structures
- Actual or proposed land use different from assumptions used in selection of the response

You should describe the deficiencies in sufficient detail to demonstrate whether the protection of human health and the environment is compromised or could be in the future.

Exhibit 3-3: Example Table for Listing Deficiencies

Deficiency	Affects Protectiveness (Y/N)

3.4.2 When and how should I develop recommendations?

You should develop and document recommendations for correcting each deficiency. Your first priority should be to make and ensure implementation of recommendations to correct deficiencies that currently impair protectiveness. These recommendations should be identified as “follow-up actions” in the five-year review report. Follow-up actions must be completed in order for the remedy to be considered protective. You may make additional recommendations that do not directly relate to achieving or maintaining the protectiveness of the remedy at your discretion. The following are examples of the types of recommendations that are generally considered appropriate as part of a five-year review:

- ***Need for Additional Response Actions*** – For example, additional response actions may be necessary if new risk information indicates that a remedy is not protective, or a treatment process is not achieving soil cleanup levels. EPA may implement such further response any time pursuant to CERCLA §104 or §106 authority. In your five-year report, you can recommend further investigation and the implementation of further response actions.

- **Optimization of Response Action²** – For example, when the limits of a groundwater plume have contracted due to pumping, and some monitoring wells no longer register contamination levels above cleanup levels, the sampling plan may be revised to eliminate these wells from the sampling routine or reduce the frequency of their sampling. It may also be possible to remove specific groundwater extraction wells from service and increase the pumping rate on others to optimize groundwater remediation.
- **Ensure Enforcement of Access and Institutional Controls** – For example, when site trespass had been observed, you could recommend repair of the fence and the evaluation of the need for additional security measures.

For each recommendation, you should identify the party responsible for implementation, the agency with oversight authority, and a schedule for completion. You should clearly identify any recommendation that needs to be addressed to achieve protectiveness as a follow-up action. Exhibit 3-4 provides an example of a table that you can use in your five-year review report for documenting both recommendations and follow-up actions.

Some actions can be implemented directly on the basis of your five-year review report, whereas others will require further documentation. For instance, if you list repairing fencing as a follow-up action, you can do so without any further documentation. However, if you recommend evaluating or altering the remedy, you should recommend pursuing this change using an ESD or ROD Amendment.

Exhibit 3-4: Example Table for Listing Recommendations and Follow-up Actions

Recommendations/ Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Follow-up Actions: Affects Protectiveness (Y/N)

3.4.3 How should I make protectiveness statements?

Protectiveness statements document whether a remedy is or is not protective of human health and the environment. For sites with more than one OU, you should write separate protectiveness statements for each OU at which a remedial action has begun. Once these sites have reached construction completion, you should also develop an additional protectiveness statement covering all of the remedies at a site. Each statement should be accompanied by a discussion explaining and supporting the protectiveness determination. See Chapter 4, Section 4.4 for further guidance on developing protectiveness statements, including examples.

3.5 How should I structure a five-year review report?

After you finish collecting and evaluating site information, you will write a five-year review report. Five-year review reports document the results of a review. Reports summarize deficiencies, recommendations, and follow-up actions, and document protectiveness statements. Reports also provide the background information necessary to understand the review analysis, and discuss the findings of review activities.

Five-year review reports should be written for the general public as well as for lead and support-agency managers. Therefore, **you should write a five-year review report with the assumption that the reader will be someone unfamiliar with the site.** Your report should clearly present all of the information needed to understand the past activities at the site and the current status of all remedial actions.

This guidance includes a suggested report template (Appendix A) and a sample review report (Appendix B). The suggested review report format consists of three parts: a data summary form, a report template, and a checklist. **You should ensure that your report provides the necessary information as shown in the checklist, as appropriate to your site.** Exhibit 3-5 summarizes the contents of a five-year review report.

Exhibit 3-5: Summary of the Contents of a Five-Year Review Report

The following report sections...	should include these topics when appropriate:
I. Introduction	<ul style="list-style-type: none"> – who conducted the review, when, and for what site – the purpose of the review – whether the review was required by statute or as a matter of policy – whether it is the first review or a subsequent review at the site – what action triggered the review
II. Site Chronology	<ul style="list-style-type: none"> – dates of major events (such as the initial discovery of contamination, NPL listing, decision and enforcement documents, start and completion of remedial actions, construction completion, and prior five-year reviews)
III. Background	<ul style="list-style-type: none"> – physical characteristics – land and resource use – history of contamination – initial response – contaminants
IV. Remedial Actions	<ul style="list-style-type: none"> – remedy selection – remedy implementation – system operations/O&M – progress since the last five-year review

Exhibit 3-5 (continued)

The following report sections...	should include these topics when appropriate:
V. Five-Year Review Process	<ul style="list-style-type: none"> - who the review team members were - what community notification activities took place - what the tasks of this five-year review were
VI. Five-Year Review Findings	<ul style="list-style-type: none"> - review of monitoring and sampling data - review of standards, TBCs, and contaminant characteristic data - interviews - site inspection - risk recalculation/assessment
VII. Assessment	<ul style="list-style-type: none"> - health and safety plan (HASP)/contingency plan - access and institutional controls - remedial action performance - system operations/O&M - costs of system operations/O&M - opportunities for optimization - early indicators of potential remedy failure - changes in the standards identified as ARARs at the time of the ROD, newly promulgated standards, and TBCs - changes in exposure pathways - changes in toxicity and other contaminant characteristics - changes in risk assessment methodologies - any other information that could call into question the protectiveness of the remedy
VIII. Deficiencies	<ul style="list-style-type: none"> - list of any deficiencies
IX. Recommendations and Follow-up actions	<ul style="list-style-type: none"> - list of any recommendations, including follow-up actions to achieve protectiveness, parties responsible for implementation, agencies with oversight authority, and schedule for completion
X. Protectiveness Statement(s)	<ul style="list-style-type: none"> - protectiveness statements developed at the OU level and for the site as a whole at construction complete sites (see Exhibit 4-5 for model language for protectiveness statements and major points to be addressed in the supporting discussion)
XI. Next Review	<ul style="list-style-type: none"> - statement on when the next review is required, the trigger for the next review, and what tasks should be performed as part of that review, or explanation of why no further five-year reviews are needed
XII. Other Comments	<ul style="list-style-type: none"> - other conclusions or concerns

Notes:

1. “System operations” encompasses the same tasks as operation and maintenance. This document refers to “system operations” in cases where these activities are considered part of the remedial action, for example, with Long-Term Response Actions.
2. The term “optimization” refers to a process that can be applied to both long-term monitoring and sampling programs and to the operation of remedial facilities including extraction wells and treatment systems. The goal of optimizing monitoring programs is to reduce costs by collecting and processing only relevant data or by applying the most efficient sampling and monitoring methods. Optimization of pump and treatment remedies seeks to operate only the wells that are necessary for aquifer control and restoration in the most efficient cycles and configurations. As plumes contract with time, there may be opportunities to take some wells out of service and to reduce loads on treatment facilities.

4.0 Assessing the Protectiveness of the Remedy

This chapter provides guidance in determining whether a remedy is, or is expected to be, protective of human health and the environment. In general, you can make this determination by examining whether the remedy is achieving or will achieve the remedial action objectives that are stated in the ROD.

As stated in Chapter 3, you should generally determine the protectiveness of the remedy by answering three key questions:

- **Question A** – Is the remedy functioning as intended by the decision documents?
- **Question B** – Are the assumptions used at the time of remedy selection still valid?
- **Question C** – Has any other information come to light that could call into question the protectiveness of the remedy?

Your collection and review of pertinent site and remedy information are the basis for assessing protectiveness. The following sections examine each of these questions. They aid you in synthesizing the information collected during the review so that you can develop an overall determination of whether the remedy is protective of human health and the environment, and accompanying protectiveness statements.

4.1 Question A: Is the remedy functioning as intended by the decision documents?

To determine if the remedy is functioning as described in the decision documents (e.g., the ROD or Action Memorandum), you should first consider its implementation status—not yet begun, under construction, operating, or completed. For instance, a review is narrower in scope for a remedial action when construction is still underway than it is for an operating or completed action. As shown in Exhibit 4-1, it is important to consider the status of a remedial action when choosing what factors to examine.

4.1.1 How do I answer Question A for a remedial action that has not begun yet?

At some sites, one or more remedial actions already underway may trigger a five-year review before other remedial actions have begun. In the five-year review report you should describe actions taken to address immediate threats for each OU or portion of the site where a remedial action has not begun. In addition, you should provide a brief description of the source, media, and contaminants of concern at these OUs, and identify the remedial stage of the OU (e.g.,

Remedial Investigation/Feasibility Study [RI/FS]). You should also provide a succinct description of the remedy, if the remedy has been selected. Finally, you should include a projected date for when construction is expected to begin at that OU.

Exhibit 4-1: Factors to Examine for Each Remedial Action

If...	then you should...
the remedial action has not begun	<ul style="list-style-type: none"> - describe how immediate threats have been addressed (including the implementation of access controls) - describe the OU, media, and contaminants of concern - describe the remedy, if it has been selected - describe the location of the OU in the Superfund pipeline
the remedial action is under construction	<ul style="list-style-type: none"> - confirm that the HASP/Contingency Plan is in place - confirm that other measures addressing immediate threats are in place and prevent exposure (including access and institutional controls)
the remedial action is operating or completed	<ul style="list-style-type: none"> - confirm that the HASP/Contingency Plan is in place - confirm that other measures addressing immediate threats are in place and prevent exposure (including access and institutional controls) - verify that the remedy is functioning as described in decision documents and as certified by closeout reports, and whether performance standards are (or are likely to be) met - evaluate the implementation of system operations/O&M - consider ways to optimize the performance of systems, if appropriate - check for early indicators of potential remedy failure - review system operations/O&M costs, if available and appropriate

4.1.2 How do I answer Question A for a remedial action that is under construction?

If your site or OU has a remedial action that is under construction, you should generally conduct a streamlined review of that remedial action. The purpose of this review is to confirm that immediate threats have been addressed. You can usually conduct a limited document review, sufficient to acquaint yourself with site conditions and the status of the remedial action. Examples of helpful documents for your review include the ROD Declaration (or Action Memorandum); remedial design, remedial action, and construction status documents; and enforcement documents such as Consent Decrees, Unilateral Administrative Orders, and Administrative Orders on Consent. In general, you should assess the following:

- **Compliance with the Health and Safety Plan (HASP) and/or Contingency Plan** – confirm that the HASP and/or Contingency Plan are in place and properly implemented so that workers are protected and short-term threats are mitigated

- **Implementation of institutional controls and other measures** – confirm that access (e.g., fencing and/or security guards) and institutional controls needed at this stage of the remediation are in place and prevent exposure, and other actions (e.g., removals) necessary to ensure that immediate threats have been addressed are complete

You should collect information regarding site conditions, access controls, obvious failures of institutional controls, and concerns of site neighbors. Because the lead agency typically maintains an ongoing presence at sites with remedies under construction, you may not need to conduct a separate site inspection and interviews to gather this information. See Section 3.3.2 for the definition of “ongoing presence.”

4.1.3 How do I answer Question A for a remedial action that is operating or completed?

Review of an operating or completed remedial action addresses more aspects of remedy implementation than a review of a remedial action under construction. Definitions of operating remedial actions and completed remedial actions follow:

- **Operating remedial actions** include treatment components requiring several years to reach cleanup levels. This situation often applies to groundwater and surface water restoration, including natural attenuation. It can also apply to soil vapor extraction and bioremediation.
- **Completed remedial actions** are those where construction is complete and cleanup levels have been achieved.

Your review of these remedial actions should usually include a document review, as well as a site inspection and interviews when appropriate. Examples of helpful documents include the Interim or Final Remedial Action Report, decision documents such as the ROD, ROD Amendments, and ESDs, and enforcement documents such as Consent Decrees, Unilateral Administrative Orders, and Administrative Orders on Consent. In general, you should assess the following:

- **Compliance with the HASP and/or Contingency Plan** – confirm that the HASP and/or Contingency Plan are in place and properly implemented so that workers are protected and short-term threats are mitigated.
- **Implementation of institutional controls and other measures** – confirm that access (e.g., fencing and/or security guards) and institutional controls needed at this stage of the remediation are in place and that they prevent exposure; confirm that other actions (e.g., removals) necessary to ensure that immediate threats have been addressed are complete.

- **Remedial action performance** – verify that the remedial action continues to be operating and functioning as designed, and is performing as expected in achieving cleanup levels.
- **System operations/O&M** – confirm that operating procedures, as implemented, will maintain the effectiveness of response actions. This evaluation might include, but is not limited to, the review of monitoring reports.
- **Costs of system operations/O&M** – examine system operations/O&M costs if they are available and relevant to the five-year review. Compare annual costs to the original cost estimate; large variances from the original cost estimate might indicate potential remedy failure or deficiencies.
- **Opportunities for optimization** – if apparent during the course of review activities, identify opportunities to improve the performance and/or reduce the costs of monitoring, sampling, and treatment systems.
- **Early indicators of potential remedy failure** – investigate and identify problems that could lead to remedy failure or suggest protectiveness is at risk unless changes are made. Problems could include frequent equipment breakdowns or replacement, or large variances in operating costs (if cost data are available).

4.2 Question B: Are the assumptions used at the time of remedy selection still valid?

You should consider significant changes in promulgated standards and other information when evaluating the protectiveness of the remedy. **Exhibit 4-2 presents a series of questions that, at a minimum, you should consider in determining whether the bases of the assumptions used at the time of remedy selection are still valid and if not, have conditions or knowledge changed in a way that calls the protectiveness of the remedy into question.** Exhibit 4-2 also groups these questions according to the type of assumption. The remainder of this section will help you assess the impact of each type of change.

4.2.1 How should I check the impact of changes in standards and TBCs?

Cleanup levels or actions may be based on ARARs identified in the ROD (as opposed to calculated site-specific risk as discussed in Section 4.2.3). For example, the cleanup levels for a groundwater remedy may be based on the Safe Drinking Water Act maximum contaminant levels (MCLs) if these were identified as ARARs in the ROD. Although ARARs are “frozen” at the time of ROD signature, you should examine changes to these standards to determine whether they call into question the protectiveness of the remedy. Similarly, you should also consider

Exhibit 4-2: Example Questions to Determine if an Assumption Upon Which the Remedy was Based has Changed

For an assumption based on ... an example question might be...	
standards or “to be considereds”	Have the standards identified as ARARs in the ROD which bear on the protectiveness of the remedy been revised? Are there newly promulgated standards that might apply or be relevant and appropriate to the site and which bear on the protectiveness of the remedy? Are there changes in “to be considereds” which bear on the protectiveness of the remedy?
exposure pathways	Has land use or expected land use on or near the site changed? (e.g., industrial to residential, commercial to residential)
exposure pathways	Have any human health or ecological routes of exposure or receptors changed or been newly identified? (e.g., dermal contact where none previously existed, new populations or species identified onsite or near the site)
exposure pathways	Are there newly identified contaminants or contaminant sources?
exposure pathways	Are there unanticipated toxic byproducts of the remedy not previously addressed by the decision documents? (e.g., byproducts not evaluated at the time of remedy selection)
exposure pathways	Have physical site conditions changed such that protectiveness may be affected? (e.g., changes in anticipated direction or rate of groundwater flow) Has understanding of physical site conditions changed? (e.g., identification of a new aquitard)
toxicity and other contaminant characteristics	Have toxicity factors for contaminants of concern at the site changed? Have other contaminant characteristics changed? (e.g., new Integrated Risk Information System (IRIS) evaluations)
human and ecological risk assessment	Have standardized risk assessment methodologies changed? (e.g., new standard exposure scenarios)

newly promulgated standards that could be ARARs² if they call into question the protectiveness of the remedy. Finally, “to be considereds” (TBCs) may also have been used to help select cleanup levels. TBCs are environmental policies or proposals that are not ARARs, but do address site-specific concerns and may be used in determining the cleanup levels necessary for protection of human health and the environment. You should evaluate these changes in TBCs if they could affect the protectiveness of the remedy.

You only need to consider changes in standards that were identified as ARARs in the ROD, newly promulgated standards, and TBCs **that bear on the protectiveness of the remedy** during your five-year review. For example, you should review new or revised chemical-specific requirements, such as MCLs or Federal ambient water quality criteria, if they were considered ARARs in the ROD. You should also review changes in action- and location-specific requirements when they may affect the protectiveness of the remedy.

In evaluating a change in a standard that was identified as an ARAR in the ROD, a newly promulgated standard, or a TBC, you should establish whether the new requirement indicates that the old requirement is no longer protective. You only need to conduct a follow-up action when the old requirement is not protective. For example, a State may adopt a new, more stringent water quality standard for dissolved copper because toxicity studies reveal that the old standard is not adequate. If the risk associated with the remedy's cleanup level now falls outside of the generally acceptable risk range, you could recommend that a new cleanup level be adopted and, if necessary, that the remedy be modified. Your recommendation should reference the appropriate process and decision document such as an ESD or ROD Amendment.

The flowchart presented in Exhibit 4-3 illustrates the process you should use to evaluate changes in standards. (Although Exhibit 4-3 addresses changes in standards, the review of changes in TBCs should follow a similar process.) You should begin by identifying the following:

- Changes in the standards identified as ARARs in the ROD that bear on the protectiveness of the remedy
- Federal and State laws and regulations promulgated since the signing of the ROD that are potentially applicable or relevant and appropriate, and might bear on the protectiveness of the remedy
- Changes in TBCs in cases where the protectiveness of the original remedial decision may be affected

If there are no changes to relevant standards identified as ARARs in the ROD, and no newly promulgated standards or TBCs that might affect the protectiveness of the remedy, your analysis is complete. If there are changes, you should establish whether the remedy remains protective in light of the new information. If the remedy is not protective, then you should develop appropriate follow-up actions (see Chapter 3, Section 3.4.2 for guidance on developing appropriate follow-up actions).

Exhibit 4-4 presents a hypothetical situation where there was a change in the application of a standard for a hypothetical contaminant, Chemtox. Exhibit 4-5 illustrates the process you would use to assess the impact of these changes on the remedy's protectiveness. The left-hand side of Exhibit 4-5 repeats the steps from the flow chart in Exhibit 4-3 that apply to this scenario; the right-hand side shows the findings of the assessment of the change.

Exhibit 4-3: Evaluating Changes in Standards

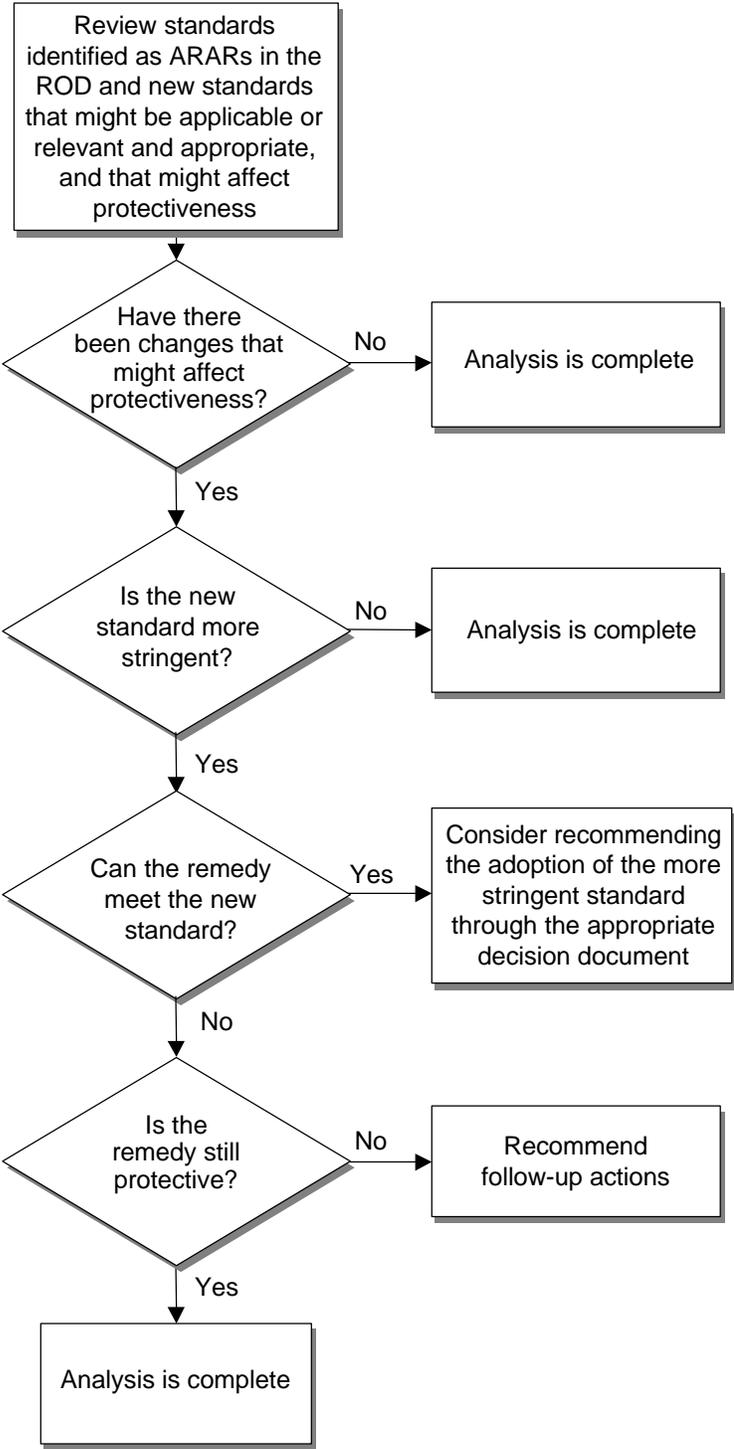


Exhibit 4-4: Hypothetical Scenario for a Change in a Standard

During the 1998 five-year review for the Flower Dye site in the State of Franklin, the review team learned that the State drinking water standard for 1,2,5-Chemtox of 3 $\mu\text{g/L}$ had been applied to all classes of aquifers in the State beginning in 1994. Prior to this date, the State had not required all of its aquifers to meet drinking water standards.

The ROD for the site, signed in 1988, did not require a reduction in the level of Chemtox in the aquifer because the State standard was not applicable. However, the aquifer was being treated using a pump and treatment system to remove PCE, which had been used as a solvent to extract dye from flower petals. This process pumped the water to the surface, where the PCE was removed via air stripping, and the treated water was used to recharge the aquifer.

In examining the treatment records, it was identified that Chemtox was also being removed from the water by the air stripping process to levels below the State standard. It was determined that Chemtox levels were lower than PCE levels, and the calculated rate of removal of Chemtox exceeded that of PCE. Therefore, it was determined that by the time the PCE levels in the aquifer had been reduced to acceptable levels, the Chemtox levels would be reduced enough to meet the standard as well.

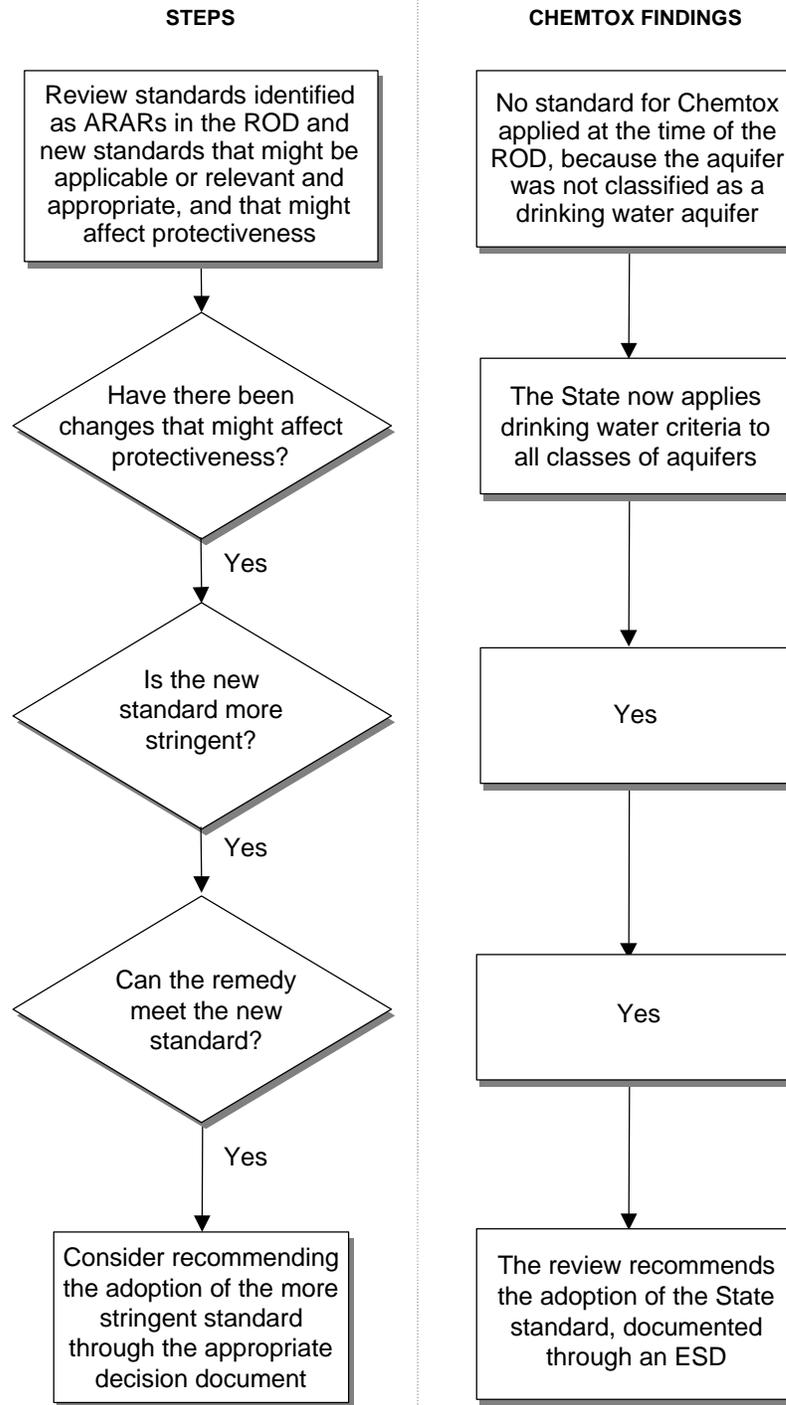
4.2.2 How should I check the impact of changes in exposure pathways?

You should consider changes in site conditions that affect an exposure pathway when determining protectiveness. Generally, you will only consider changes that go beyond what was known at the time of remedy selection. As shown in Exhibit 4-2, these changes might include such things as new land uses, new receptors, new contaminants, or a new understanding of geological conditions. In evaluating this information, you should work closely with a risk assessor to establish the impact such changes may have on the estimated risk at your site.

Depending on the significance of the changes, it may be necessary for you to reconsider estimated risk. You should reconsider risk³ only if it is necessary to determine whether the remedy remains protective of human health and the environment. The reconsideration of risk should follow the specifications of the NCP. In most cases, your determination should be based on whether the risk is within or below the generally acceptable risk range of 10^{-4} to 10^{-6} for carcinogenic risk and the hazard index is below 1 for non-carcinogenic effects.

You need to conduct a risk recalculation or risk assessment as part of a five-year review only if a risk recalculation is needed to assess whether the remedy is meeting the remedial action objectives stated in the ROD. For example, you may need to include a new risk assessment when there is a new exposure pathway, new potential contaminant of concern, or an unanticipated toxic byproduct of the remedy. **A risk assessment may be appropriate if the remedial action objectives stated in the ROD are sufficiently comprehensive to cover these**

Exhibit 4-5: Decision Process for a Hypothetical Change in a Standard



new conditions and the remedy may not already be providing adequate protection of human health and the environment. If a new condition at the site is not covered by the remedial action objectives, then in the five-year review report, you should recommend further investigation to determine whether an additional response action is needed.

4.2.3 How should I check the impact of changes in toxicity and other contaminant characteristics?

Cleanup levels at a site may be based on the calculated risk for chemicals and/or media that have no promulgated standards (e.g., site-specific soil action levels) or that have standards that are not sufficiently protective for site-specific conditions. If the remedy must meet a site-specific, risk-based cleanup level, you should check to see whether toxicity or other contaminant characteristics used to determine the original cleanup level have changed. In addition to toxicity, you should examine other contaminant characteristics that are relevant to the cleanup level and that determine the nature and extent of its migration, and its effect on receptors (i.e., solubility, sorption characteristics, volatility, ability to bioaccumulate, etc.) If there have been changes in these characteristics, you may need to recalculate risk. A change in the cancer slope factor, for example, may suggest that the risk from a chemical concentration is above the acceptable cancer risk range (10^{-4} to 10^{-6}).

You may work with a Region's risk assessor to determine whether there have been changes in toxicity or other contaminant characteristics and whether further investigation is needed. The preferred resource for checking changes is EPA's Integrated Risk Information System (IRIS). In addition, you may find it useful to refer to the Risk Assessment Guidance for Superfund (RAGS). EPA's Office of Emergency and Remedial Response (OERR) also provides non-cancer and cancer toxicity data on its Internet web site. There currently are no peer reviewed, EPA-accepted ecological risk toxicity values.

The flowchart presented in Exhibit 4-6 shows the process you should use to evaluate the significance of changes in toxicity values and other contaminant characteristics when conducting a five-year review. You should first identify any site-specific, risk-based, cleanup levels and investigate relevant changes in contaminant characteristics. If the estimated risk for a contaminant has not changed, your analysis is complete.

If the estimated risk has increased, then you should determine whether the new estimated risk is acceptable. In most cases, you should base this determination on whether the risk is within or below the generally acceptable risk range of 10^{-4} to 10^{-6} for carcinogenic risk and the hazard index is below 1 for non-carcinogenic effects. If the estimated risk level is not protective, you should examine whether the existing remedy can meet a revised cleanup level that results in an acceptable risk.

Exhibit 4-6: Evaluating Changes in Toxicity and Other Contaminant Characteristics

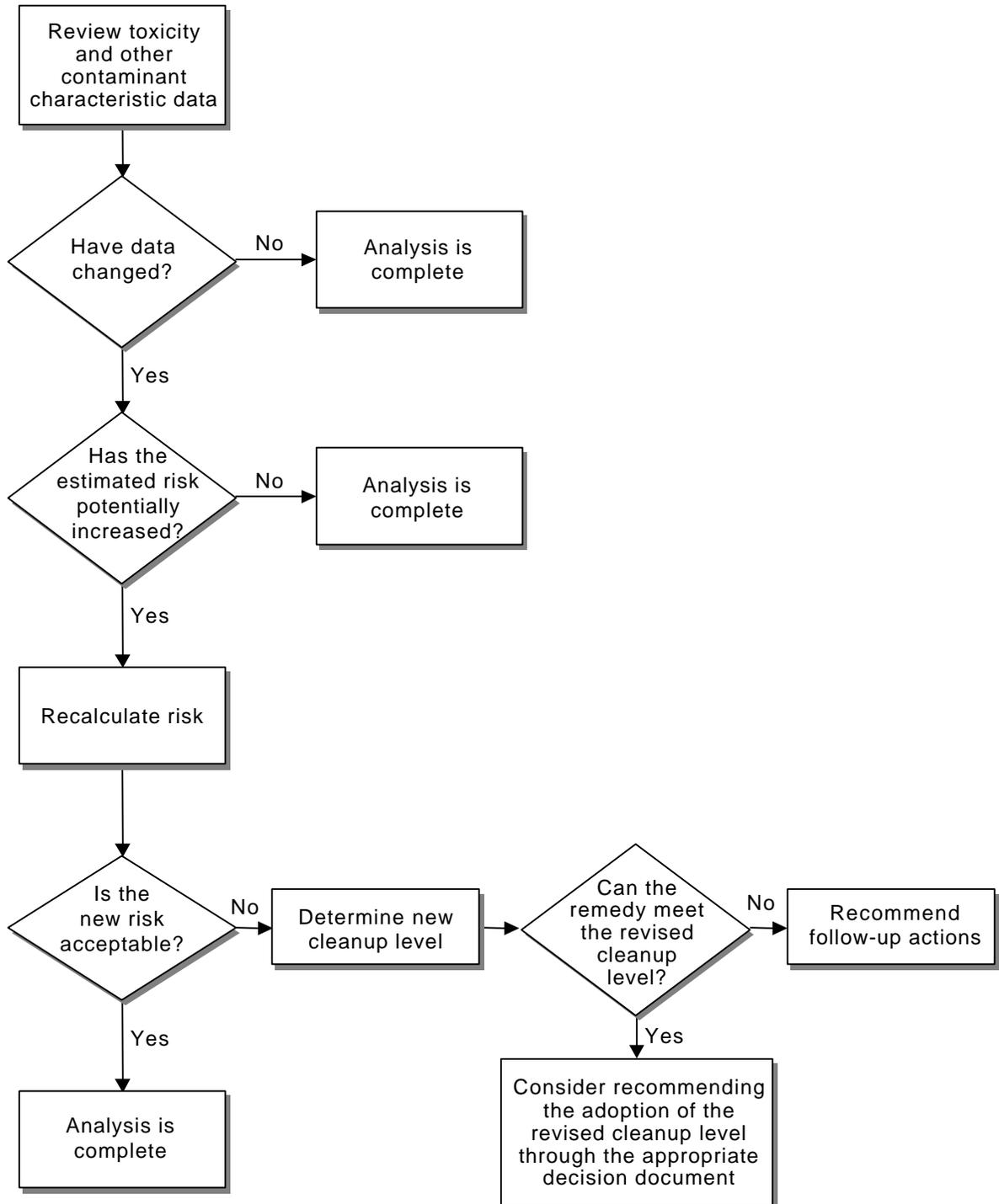


Exhibit 4-7: Hypothetical Scenario for a Change in Toxicity

During the 1998 five-year review at the Old Pesticide Disposal site in the State of Franklin, the review team discovered that the Cancer Slope Factor (CSF) for the pesticide "Hypochem" had been increased in 1996 from 0.05 (mg/kg-day)⁻¹ to 20.00 (mg/kg-day)⁻¹. Hypochem, among other contaminants, had been found in the water supply well across the street from the Old Pesticide Disposal facility at a concentration of 0.001 mg/L. When the ROD was signed in 1986, this level had been initially assumed to be associated with a risk level less than one in one million excess cancer cases based on the following equations and site-specific exposure parameters:

$$\text{Average Daily Intake (mg/kg-day)} = (C_{\text{Water}} * IR * EF * ED) / (BW * AT) \quad (1)$$

where:

<u>Parameter</u>		<u>Site Scenario</u>
C _{Water}	= Contaminant concentration in water (mg/L)	
IR	= Drinking water intake (ingestion) rate (L/day)	2 L/day
EF	= Exposure frequency (days/year)	350
days/year		
ED	= Exposure duration (years)	30 years
BW	= Body weight (kg)	70 kg
AT	= Average time (days)	25,550 days

$$\text{Target Risk (R)} = \text{Average Daily Intake} * \text{Cancer Slope Factor} \quad (2)$$

When equations (1) and (2) are combined, the allowable concentration of Hypochem (C_{Water}) that corresponds to a given risk level "R," can be determined by inserting the site-specific parameters into the following equation:

$$C_{\text{Water}} \text{ (mg/L)} = (R * BW * AT) / (CSF * IR * EF * ED) \quad (3)$$

The Old Pesticide Disposal site's original one in one million risk level (R = 1x10⁻⁶) corresponded to an original CSF of 0.05. Thus, equation (3) yielded a maximum Hypochem concentration of:

$$C_{\text{Water}} \text{ for R of } 1 \times 10^{-6} = 0.001704 \text{ mg/L}$$

Since the actual concentration of Hypochem in the water in 1986 was 0.001 mg/L, and thus fell within acceptable limits, there was no need to reduce its levels. (The risk corresponded to 0.6 new cases per million people.) However, using the new CSF of 20.00 and a one in one million risk increase (R = 1x10⁻⁶), the new maximum Hypochem concentration becomes:

$$C_{\text{Water}} \text{ for R of } 1 \times 10^{-6} = 0.00000426 \text{ mg/L}$$

and using the new CSF of 20.00 and a one in a ten thousand risk increase (R = 1x10⁻⁴), equation (3) yields a C_{Water} value of:

$$C_{\text{Water}} \text{ for R of } 1 \times 10^{-4} = 0.000426 \text{ mg/L}$$

Exhibit 4-7 (continued)

If the concentration of Hypochem in the water is still 0.001 mg/L, then given the new cancer risk factor, the levels of Hypochem are not acceptable because the risk based on this new factor is greater than one in ten thousand. (In fact, the risk level associated with a concentration of 0.001 mg/L now corresponds to 235 new cases in one million people, or 2.35 new cases in ten thousand people.)

Based on this result, the Region determined that the original cleanup level and remedy had to be revised. The 1986 ROD selected pumping, air stripping of the groundwater to remove solvents also found in the groundwater, and groundwater recharge. Based on sampling records of the recharge water, the stripping unit did not significantly reduce Hypochem concentrations. By adding a carbon adsorption system to the treatment train, the Hypochem concentrations would be reduced to an acceptable level. Additionally, the review team determined that, at the projected rate of contaminant removal, the remediation system would have to be operated for at least ten years longer than previously planned to reduce Hypochem levels in the aquifer enough to achieve one in ten thousand risk level.

Exhibits 4-7 and 4-8 show the application of this process for a hypothetical contaminant, Hypochem. Exhibit 4-7 describes the Hypochem scenario. In Exhibit 4-8, the left-hand side of the exhibit shows the steps from the flow chart in Exhibit 4-6 that apply to this scenario. The right-hand side shows the findings from the hypothetical assessment of this contaminant.

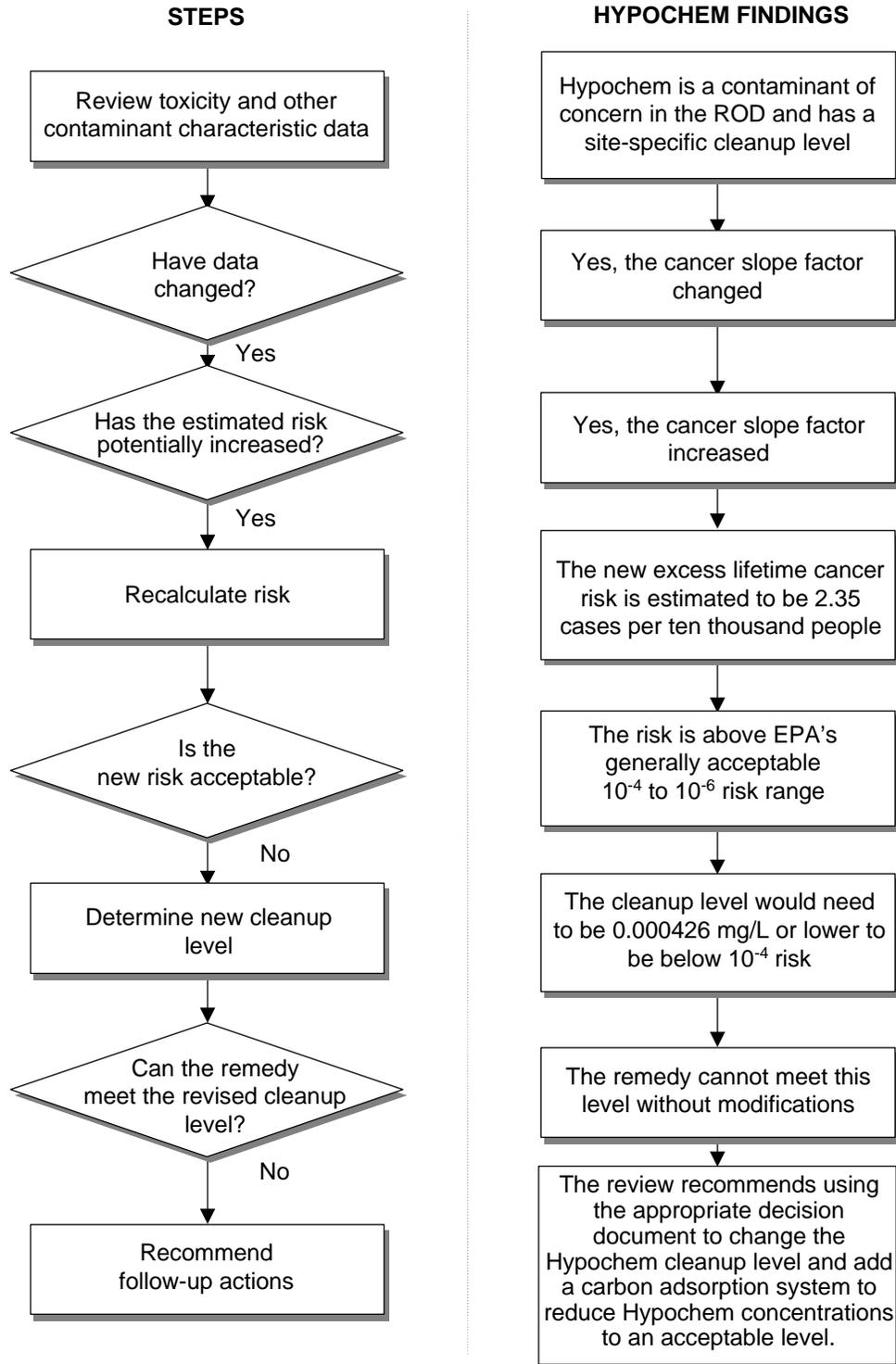
4.2.4 How should I check the impact of changes in risk assessment methods?

Working with a risk assessor, you should evaluate whether any standardized risk assessment methodologies have changed in a way that affects the protectiveness of the remedy. For example, changes to the Integrated Exposure Uptake Biokinetic Model for evaluating lead exposure could call into question the protectiveness of a remedy at a site where soils are contaminated with lead.

4.3 Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

You should consider any other information that comes to light that could call into question the protectiveness of the remedy. It is expected that virtually all considerations related to the protectiveness of the remedy will be covered by Questions A and B. However, in some instances, there will be some other factor about the site that you will want to consider during the review. Situations to watch out for include the following:

Exhibit 4-8: Decision Process for a Hypothetical Change in Toxicity



- Ecological risks have not been adequately addressed at a site, and there is not a plan to address them through a future action
- The site, although located entirely above the national flood insurance 500-year flood boundary, was partially inundated by a 100-year flood

If ecological risks have not been adequately addressed at a site, and there is not a plan to address them through a future action, then you may need to address them at the time of the five-year review by conducting a screening ecological risk assessment.

4.4 How do I determine protectiveness?

After addressing questions A, B, and C, you should be ready to determine the protectiveness of the remedy or remedies at a site and to document the rationale for your determination. You will need to make a protectiveness statement for each OU and an additional, comprehensive protectiveness statement for those sites that have reached construction completion. This section provides guidelines on how to decide whether a remedy is protective of human health and the environment and on the substance and format of protectiveness statements.

4.4.1 How do I decide when a remedy should be considered protective and when it should not?

Your determination of whether the remedy remains protective of human health and the environment is generally reached by evaluating whether the remedy is achieving or will achieve the remedial action objectives stated in the ROD. To make this determination, answer questions A, B, and C, as presented in this chapter. If the remedy is achieving or is expected to achieve the current remedial action objectives, you can consider the remedy to be protective, even if there are other circumstances at a site that suggest that further response actions may be necessary. Although the remedy is protective in this case, in the five-year review report, you may recommend further investigation to determine whether additional response actions are necessary.

At some sites, you may notice indications of remedy failure. If the remedy has failed (e.g., containment has been breached, treatment is not effective) and all possible ways to correct the failure have been tried, then it is clear that the remedy will not meet remedial action objectives and the remedy is not protective. However, in other cases there may be problems with the remedy that can be corrected. In these cases, you should consider whether

1. An immediate threat is present; or
2. The migration of contaminants is uncontrolled.

If either of these two conditions apply, the remedy is not protective. However, if immediate threats have been addressed and there is no uncontrolled migration of contaminants, then you can consider a remedy to be protective if, after the implementation of the five-year review recommendations, the remedy will be able to meet remedial action objectives. For instance, where modifications can be made such as changing the location of wells, the pumping rate, or the pumping frequency so that the remedy is expected to meet cleanup levels, you should consider the remedy to be protective. You should note in the five-year review report that the implementation of these recommendations is necessary to ensure the long-term protectiveness of the remedy.

For remedial actions that require several years to reach cleanup levels (e.g., some groundwater pump and treatment, monitored natural attenuation, bioremediation, and soil vapor extraction actions), you may note that the action will not be able to meet the current cleanup levels and remedial action objectives. For example, the remedial action objective for a groundwater pump and treatment remedy may be to restore an aquifer to drinking water standards. However, after several years of operation, it may be clear that a Technical Impracticability Waiver is needed. In this case, you should consider the remedy protective in the short term if immediate threats have been addressed and there is no uncontrolled migration of contaminants. In your five-year review report, you should state that the remedy is not expected to meet current cleanup levels, but that human health and the environment are protected by elements of the remedy in the short term. (Section 4.4.2 provides an example protectiveness statement to cover this situation.) You should also recommend in your five-year review that the remedial action objectives and the remedy be adjusted using the appropriate process and decision document.

The following are examples of situations where you should consider a remedy not protective:

- Exposure pathways to be addressed by the remedy continue to pose an unacceptable risk
- Institutional controls should be in place to prevent exposure, but they are not in place or are not enforced

4.4.2 How do I formulate protectiveness statements?

You should develop a protectiveness statement for each OU at which a remedial action has begun. For sites that have reached construction completion and have more than one OU, you should develop an additional comprehensive protectiveness statement covering all of the remedies at the site. You should not include this additional protectiveness statement until construction completion because until then, all remedies at the site have not necessarily been selected.

You are strongly encouraged to use one of the example protectiveness statements provided in Exhibits 4-9 and 4-10 to ensure the consistency of reports across the nation.

The statements span the range of anticipated site conditions. Exhibit 4-9 is organized by the implementation status of the remedial action. For each, you can select an affirmative or a negative protectiveness statement that applies to each OU. You should make these statements at the OU level to ensure national consistency in the reporting of protectiveness. If one part of an OU or a remedial action at an OU is not protective, you should consider the entire OU not protective. Likewise, if one OU at a site is not protective, you should consider the remedy for the entire site not protective. Examples of the additional statements that you should use for sites that have reached construction completion are provided in Exhibit 4-10.

In the case of OUs with remedial actions that require several years to reach cleanup levels, you have a third choice. In addition to an affirmative and a negative statement, there is a statement for remedies that are not expected to meet current cleanup levels and remedial action objectives. You should use this statement when immediate threats have been addressed and the migration of contaminants is controlled. As noted in Section 4.4.1, one example of this situation is a groundwater pump and treatment remedy that qualifies for a Technical Impracticability Waiver.

In the five-year review report, you should present protectiveness statements in the first sentence in a paragraph that explains the specific protectiveness determination. **You should accompany each statement with a supporting discussion** in the remainder of the paragraph. The major points that you should address in the supporting discussion are also shown in Exhibit 4-9.

Exhibit 4-9: Protectiveness Statements and Items to Address for Remedial Actions

If the remedial actions at the OU are ...	then use this statement ...	and address these items in the supporting discussion.
OUs with remedial actions under construction		
protective	“The remedy at OU X is expected to be protective of human health and the environment upon completion, and immediate threats have been addressed.”	<ul style="list-style-type: none"> – ways that immediate threats have been addressed – measures that are in place and prevent exposure: <ul style="list-style-type: none"> • HASP/Contingency Plan • access controls • institutional controls
not protective	“The remedy at OU X is not protective.”	<ul style="list-style-type: none"> – immediate threats posed by media and/or contaminant that have not been adequately addressed – measures to prevent exposure that are not in place or sufficient
OUs with operating remedial actions		
protective	“The remedy at OU X is expected to be protective of human health and the environment, and immediate threats have been addressed.”	<ul style="list-style-type: none"> – how the remedial action is operating and functioning as designed – how containment is effective – how levels of contaminants are falling as needed to meet cleanup levels or revised levels – measures that are in place and prevent exposure: <ul style="list-style-type: none"> • HASP/Contingency Plan • access controls • institutional controls
protective, because immediate threats have been addressed and there is no uncontrolled migration of contaminants	“The remedy at OU X currently protects human health and the environment because (describe the elements of the remedy that protect human health and the environment in the short term).”	<ul style="list-style-type: none"> – source containment, access, and/or institutional controls that are in place and functioning effectively – why the remedy is not expected to meet the Y and Z requirements of the ROD once it is complete – whether further investigation is needed
not protective	“The remedy at OU X is not protective.”	<ul style="list-style-type: none"> – why the remedy is not expected to meet the Y and Z requirements of the ROD once it is complete – source containment, access, or institutional controls that are not in place or functioning effectively – whether the remedy will be protective once the required actions are completed – whether further investigation is needed

Exhibit 4-9 (continued)

If the remedial actions at the OU are ...	then use this statement ...	and address these items in the supporting discussion.
OUs with completed remedial actions		
protective	“The remedy at OU X is protective of human health and the environment.”	<ul style="list-style-type: none"> – how containment is effective – that cleanup levels (or revised levels) have been achieved – measures that are in place and prevent exposure: <ul style="list-style-type: none"> • HASP/Contingency Plan • access controls • institutional controls
not protective	“The remedy at OU X is not protective.”	<ul style="list-style-type: none"> – how the remedy does not meet the Y and Z requirements of the ROD – source containment, access, or institutional controls that are not in place or functioning effectively – whether the remedy will be protective once the required actions are completed – whether further investigation is needed

Exhibit 4-10: Protectiveness Statements for Sites That Have Reached Construction Completion

If the remedy is ...	then use this statement:
protective	“Because the remedial actions at operable units x and y are protective/are expected to be protective, the remedy for the site is/is expected to be protective of human health and the environment.”
not protective	“The remedial actions at operable units x and y are protective. However, because the remedial action at operable unit z is not protective, the remedy for the site is not protective of human health and the environment at this time.”

Notes:

1. The NCP states, “Requirements that are promulgated or modified after ROD signature must be attained (or waived) only when determined to be applicable or relevant and appropriate and necessary to ensure that the remedy is protective of human health and the environment.” See 40 CFR 300.430(f)(1)(ii)(B)(1).
2. ARARs are only those requirements identified in the ROD as being applicable or relevant and appropriate to the remedy. Newly promulgated standards that did not exist at the time of the ROD and that bear on protectiveness of the remedy should also be considered in the review.
3. See 40 CFR 300.430(e)(2)(I) for the NCP’s guidelines on the establishment of remediation goals (i.e., cleanup levels) prior to the ROD. These guidelines establish the criteria that should be used to evaluate whether risks are adequately addressed by the remedy. Also see OSWER Directive 9355.0-30, “Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions” (April 22, 1991).

Appendix A
Five-Year Review Report Template

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Five-Year Review Report Template

This appendix provides a checklist for five-year review reports and the suggested format for them. The checklist appears first, followed by the report template. You are encouraged to follow the template to ensure national consistency in the structure of five-year review reports. However, each report should take into account site-specific circumstances, and the preparer should modify the report format and content accordingly. For example, in some cases the report may be clearer if organized by OU, or you may need to include site-specific questions that do not appear in this appendix.

The suggested format for five-year review reports includes three main components: cover material, summary information, and the report body.

- **Cover Material** – Each report should have a title page, and, when appropriate, a memorandum either concurring with the report findings or documenting reasons for non-concurrence. The title page provides the site name and location, identifies the report's preparer, and includes a space for management approval of the report.

For sites where concurrence is appropriate, a memorandum should be attached to the front of the report. Through issuance of a separate memorandum, an EPA Region can note its concurrence or non-concurrence with the findings of a State, Indian Tribe, or other Federal agency when the Region does not draft the report. Similarly, a State, Indian Tribe, or other Federal agency may issue a concurrence memorandum for a five-year review report prepared by an EPA Region. See Chapter 1, Section 1.6 for additional information on report signatures and concurrence memoranda.

- **Five-Year Review Summary Form** – Designed for easy entry and quick reference, the summary form provides basic site and review information, as well as the deficiencies, recommendations and follow-up actions, and protectiveness statement(s) shown in the main body of the report.
- **Report Body** – The five-year review report itself documents the methods, findings, resulting conclusions, and recommendations of the review. The report's target audience is EPA and the general public. Because of the broad audience, the report should be sufficiently comprehensive to support and document protectiveness statements and other conclusions, but written to be understood by someone who is not familiar with the site.

Templates for each of these components follow. These templates provide standard formats, boilerplate text, suggested subheadings, checklists, example tables, and suggested protectiveness statements. Boilerplate text is presented in text boxes. Within the boilerplate

section, text enclosed in brackets “[]” should be added as appropriate, and *italicized* text denotes discussions that the reviewer should add.

Please keep in mind that the following guidelines, such as the suggested tables and the checklists showing items that you may want to discuss in each section, are **simply suggestions**. You do not need to include all of the information suggested by the checklists. Rather, you can use the checklists as **a guide** to what types of information can appear in the different sections of your five-year review report. You should include information that is relevant to your site and needed to ensure that the rationale behind the protectiveness determination is adequately documented.

This appendix is written in terms of “remedies,” “remedial actions,” and “remedial action objectives.” For an NPL removal-only site or a site without a ROD, you should adapt this template to meet your needs.

If the remedy is identified as not protective, you should provide an addendum to the report when all of the recommendations related to protectiveness have been completed and the remedy is considered protective. This addendum is discussed in Chapter 1, Section 1.8.

Content Checklist for Five-Year Review Reports

Use this checklist to verify that you have included all of the appropriate information in your five-year review report. Depending on site-specific circumstances, some items may not be applicable. For example, a report for a site just beginning construction will generally contain less data than for a site that has reached construction completion.

General Report Format

- Signed concurrence memorandum (if appropriate)
- Title page with signature and date
- Five-Year Review Summary Form
- List of documents reviewed
- Site Maps
- Tables and figures documenting remedy performance and changes in standards
- Interview report (if warranted)
- Site Inspection Checklist
- Photos documenting site conditions

General Site Information

- Site name
- Location (i.e., city, county, state)
- EPA ID number
- EPA Region
- Operable unit names and numbers under review
- NPL status (i.e., final, deleted, removed, non-NPL, other)

Introduction

- Lead agency
- Organizations providing analyses in support of the review (e.g., the contractor supporting the lead agency)
- Other review participants or support agencies
- Review Number (e.g., first, second)
- Review Type (i.e., statutory or policy)
- Trigger Action and Date
- Number, description, and status of all operable units at the site

Site Chronology

- List all important site events and relevant dates (e.g., Date of initial discovery of problem, dates of pre-NPL responses, date of NPL listing)

Background

- General site description (e.g., size, topography, and geology)
- Former, current and future land use(s) of the site and surrounding areas
- Site redevelopment or reuse history and/or potential
- History of contamination
- Initial response (e.g., removals)
- Contaminants

Remedial Actions

- Regulatory actions (e.g., date and description of RODs, ESD, AOC, and CD)
- Remedial action objectives
- Remedy description
- Remedy implementation (e.g., status, history, enforcement actions, performance)

System Operations/Operation and Maintenance (O&M) Information

- Remedy operation (i.e., is the remedy operating as designed?)
- Operational summary (e.g., history, modifications, problems, and successes)
- System operations/O&M requirements
- System operations/O&M effectiveness (i.e., are requirements being met and are activities effective in maintaining the remedy?)
- System operation/O&M cost summary

Progress Since Last Five-year Review (if applicable)

- Deficiencies from the previous review
- Recommendations/follow-up actions
- Actions taken
- Explanation for any actions not taken
- Results of actions

Five-Year Review Process

- Outline the process/methods of your five-year review

Site Inspection, Interviews, and Community Involvement Information

- Inspection date
- Inspection participants
- Site inspection scope and procedures
- Site inspection results, conclusions, recommendations

- Inspection checklist
- Interview date(s) and location(s)
- Interview participants (name, title, phone number, etc.)
- Interview documentation
- Interview summary
- Community involvement activities conducted as part of the review (e.g., notices, fact sheets, public meeting(s))

Assessment

- Answer Question A: Is the remedy functioning as intended by the decision documents?
- Answer Question B: Are the assumptions used at the time of remedy selection still valid?
- Answer Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

Deficiencies

- Identify deficiencies
- Determine whether deficiencies affect current protectiveness

Recommendations and Follow-up Actions

- Required/suggested improvements to current site operations
- Note parties responsible for actions
- Note agency with oversight authority
- Milestone dates

Protectiveness Statements

- Protective statement(s) for each OU
(If the remedy is not protective of human health and/or the environment, have you provided supporting discussion and information, such as current threats or level of risk, in the report to make this determination?)
- Comprehensive protectiveness statement covering all of the remedies at the site (if applicable)

Next Review

- Whether another five-year review will be done
- Expected date of next review
- Suggested tasks for next review (if appropriate)

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Five-Year Review Report

**(First, Second, etc.) Five-Year Review Report
for
Site Name
City
County, State**

Month, Year

PREPARED BY:

**Lead Agency
Name and
Location**

Approved by:

Date:

[Name]
[Title]
[Affiliation]

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Five-Year Review Report

The following Table of Contents notes typical major divisions and subheadings for five-year review reports. Subheadings can be included as appropriate for a given review report. This is only a general example.

Table of Contents

- List of Acronyms
- Executive Summary
- Five-Year Review Summary Form

- I. Introduction**

- II. Site Chronology**

- III. Background**
 - Physical Characteristics
 - Land and Resource Use
 - History of Contamination
 - Initial Response
 - Contaminants

- IV. Remedial Actions**
 - Remedy Selection
 - Remedy Implementation
 - System Operations/Operation and Maintenance (O&M)
 - Progress Since the Last Five-Year Review

- V. Five-Year Review Process**

- VI. Five-Year Review Findings**
 - Interviews
 - Site Inspection
 - Changes in Standards and To Be Considereds
 - Changes in Exposure Pathways, Toxicity and Other Contaminant Characteristics
 - Data Review

- VII. Assessment**
- Question A: Is the remedy functioning as intended by the decision documents?
- Question B: Are the assumptions used at the time of remedy selection still valid?
- Question C: Has any other information come to light that could call into question
the protectiveness of the remedy?
- VIII. Deficiencies**
- IX. Recommendations and Follow-up Actions**
- X. Protectiveness Statement(s)**
- XI. Next Review**
- XII. Other Comments**

Tables

- Table 1 - Chronology of Site Events
- Table 2 - Annual System Operations/O&M Costs
- Table 3 - Actions Taken Since the Last Five-Year Review
- Table 4 - Changes in Chemical-Specific Standards
- Table 5 - Changes in Action-Specific Requirements
- Table 6 - Changes in Location-Specific Requirements
- Table 7 - Comparison of Initial and Current Groundwater Concentrations
- Table 8 - Identified Deficiencies
- Table 9 - Recommendations and Follow-up Actions

Attachments

- List of Documents Reviewed
- Site Maps (*if not included in the body of the report*)
- Tables and Figures Documenting Remedy Performance and Changes in Standards (*if not included in the body of the report*)
- Interview Report (*if warranted*)
- Site Inspection Checklist
- Photos Documenting Site Conditions

List of Acronyms

You can include a list of acronyms used in the report here.

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Executive Summary

You can include an Executive Summary at the beginning of the report. The Executive Summary should be brief, and should include a reiteration of the protectiveness statements included in Section X of the five-year review report.

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Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name (from WasteLAN): _____		
EPA ID (from WasteLAN): _____		
Region:	State:	City/County: _____
SITE STATUS		
NPL status: <input type="checkbox"/> Final <input type="checkbox"/> Deleted <input type="checkbox"/> Other (specify) _____		
Remediation status (choose all that apply): <input type="checkbox"/> Under Construction <input type="checkbox"/> Operating <input type="checkbox"/> Complete		
Multiple OUs?* <input type="checkbox"/> YES <input type="checkbox"/> NO	Construction completion date: ___ / ___ / _____	
Has site been put into reuse? <input type="checkbox"/> YES <input type="checkbox"/> NO		
REVIEW STATUS		
Reviewing agency: <input type="checkbox"/> EPA <input type="checkbox"/> State <input type="checkbox"/> Tribe <input type="checkbox"/> Other Federal Agency _____		
Author name: _____		
Author title: _____	Author affiliation: _____	
Review period:** ___ / ___ / _____ to ___ / ___ / _____		
Date(s) of site inspection: ___ / ___ / _____		
Type of review:*** <input type="checkbox"/> Statutory <input type="checkbox"/> Policy (<input type="checkbox"/> Post-SARA <input type="checkbox"/> Pre-SARA <input type="checkbox"/> NPL-Removal only <input type="checkbox"/> Non-NPL Remedial Action Site <input type="checkbox"/> NPL State/Tribe-lead <input type="checkbox"/> Regional Discretion)		
Review number: <input type="checkbox"/> 1 (first) <input type="checkbox"/> 2 (second) <input type="checkbox"/> 3 (third) <input type="checkbox"/> Other (specify) _____		
Triggering action:**** <input type="checkbox"/> Actual RA Onsite Construction at OU # _____ <input type="checkbox"/> Actual RA Start at OU# _____ <input type="checkbox"/> Construction Completion <input type="checkbox"/> Previous Five-Year Review Report <input type="checkbox"/> Other (specify) _____		
Triggering action date (from WasteLAN): ___ / ___ / _____		
Due date (five years after triggering action date): ___ / ___ / _____		

* ["OU" refers to operable unit.]

** [Review period should correspond to the actual start and end dates of the five-year review in WasteLAN.]

*** [see page A-18 and Chapter 1 for further explanation.]

**** [see page A-19 and Chapter 1 for further explanation.]

Five-Year Review Summary Form

Deficiencies:

Summarize deficiencies (see chapter 3 and page A-30).

Recommendations and Follow-up Actions:

Summarize recommendations and follow-up actions (see chapter 3 and page A-30).

Protectiveness Statement(s):

Include individual operable unit protectiveness statements. For sites that have reached construction completion and have more than one OU, include an additional and comprehensive protectiveness statement covering all of the remedies at the site (see Chapter 4 and page A-30).

Other Comments:

Make any other comments here.

Five-Year Review Report

I. Introduction

Provide a synopsis of “who, what, where, when, and why.” Detail the following:

- *Who conducted the review, when, and for what site*
- *The purpose of the review*
- *Whether the review was required by statute or as a matter of policy*
- *Whether it is the first review or a subsequent review at the site*
- *What action triggered the review*

Further explanation and boilerplate text are provided below. Additional explanation on the following topics is provided in Chapter 1.

Who Conducted the Five-Year Review

If the USACE or a contractor has conducted an analysis in support of a five-year review, their name and the date of the analysis should also be included. Be sure to note that the USACE or contractor provided support for the five-year review, not the final five-year review report itself. Please note that a PRP’s contractor can also conduct an analysis in support of a five-year review, but their report does not constitute part of the official five-year review report. Further, EPA or a State or Indian Tribe should conduct the site inspection at enforcement-lead sites.

Boilerplate text for the explanation of who conducted the review is provided in the box below. This text is written as though the EPA is the lead agency and should be adapted when another agency or department serves as the lead agency.

The United States Environmental Protection Agency (EPA) Region (number) has conducted a five-year review of the remedial actions implemented at the (name) site in (location). This review was conducted from (month, year) through (month, year). This report documents the results of the review. *Please identify any party providing an analysis in support of the five-year review, also indicate the contractual arrangements under which this was done.*

The purpose of five-year reviews is to determine whether the remedy at a site [is/is expected to be] protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in five-year review reports. In addition, five-year review reports identify deficiencies found during the review, if any, and recommendations to address them.

Whether a Statutory or a Policy Five-Year Review

State whether the review is required by statute or completed as a matter of EPA policy. Statutory reviews are required for sites where, after remedial actions are complete, hazardous substances, pollutants, or contaminants will remain onsite at levels that will not allow for unlimited use or unrestricted exposure. Statutory reviews are only required if the ROD was signed on or after the effective date of SARA (October 17, 1986). Policy reviews should be conducted in the following circumstances:

- *Sites where a remedial action selected on or after October 17, 1986 (called a “Post-SARA” remedial action in this guidance), will allow for unlimited use and unrestricted exposure upon completion, but where it will take longer than five years to complete*
- *Sites where a remedial action selected prior to October 17, 1986 (called a “Pre-SARA” remedial action in this guidance) leaves hazardous substances, pollutants, or contaminants onsite above levels that allow for unlimited use and unrestricted exposure*
- *Sites on the NPL with only a removal action (called “NPL removal-only” sites in this guidance), where hazardous substances, pollutants, or contaminants are left onsite above levels that allow for unlimited use and unrestricted exposure, where construction is complete, and where no further action will take place*
- *State or Indian Tribe-lead NPL sites, where the remedy isn’t selected under CERCLA §121 and hazardous substances, pollutants, or contaminants are left onsite above levels that allow for unlimited use and unrestricted exposure.*

Regions may choose to conduct a policy review at a site with a no action ROD where monitoring is taking place to ensure the absence of contaminants. Regions may also choose to conduct a policy review for no action decisions where factors contributing to the assumptions underlying the no action decision may have changed.

Boilerplate text for the explanation of the type of review is provided in the box below. Text enclosed in brackets [] should be added as appropriate.

[This review is required by statute.] EPA must implement five-year reviews consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). CERCLA §121(c), as amended, states:

If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented.

The NCP part 300.430(f)(4)(ii) of the Code of Federal Regulations (CFR) states:

If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.

[Although not required by statute, this review is being conducted in accordance with EPA policy. This site has been reviewed because ...]

Other Review Characteristics

State whether the review is the first or a subsequent five-year review for the site, what action or event “triggered” the review, and the date of this action. Statutory reviews often are due five years after the “actual RA onsite construction” date shown in WasteLAN for the relevant remedial action. Policy reviews are due five years after the site has achieved construction completion.

Boilerplate text for the explanation of other review characteristics is provided in the box below. Select text from brackets as appropriate.

This is the [first/second/etc.] five-year review for the (name) site. The triggering action for this [statutory/policy] review is the date of the (triggering action) as shown in EPA’s WasteLAN database: (date). This discussion should also mention what is specifically activating the review, i.e., that hazardous substances, pollutants, or contaminants are or will be left onsite above levels that allow for unlimited use and unrestricted exposure.

In addition, if separate five-year reviews are conducted for different areas of a site, you should include in this section:

- *An explanation of this approach*
- *A description of which areas are covered by this five-year review*
- *A brief synopsis of the remedial activities and the status of five-year reviews for other areas*

II. Site Chronology

List all important site events and relevant dates in the site chronology, such as those shown in Table 1. The identified events are illustrative, not comprehensive.

Table 1: Chronology of Site Events

Event	Date
Initial discovery of problem or contamination	
Pre-NPL responses	
NPL listing	
Removal actions	
RI/FS complete	
ROD signature	
ROD Amendments or ESDs	
Enforcement documents (CD, AOC, UAO)	
Remedial Design start	
Remedial Design complete	
Superfund State Contract, Cooperative Agreement, or Federal Facility Agreement signature	
Actual RA start	
Construction dates (start, finish)	

Event	Date
Construction Completion date	
Final Close Out Report	
Previous Five-Year Reviews	

III. Background

Describe the fundamental aspects of the site, providing a clear, succinct description of site characteristics. The purpose of this section is to identify the threat posed to the public and environment at the time of the ROD, so that the performance of the remedy can be easily compared with the site conditions the remedy was intended to address. Include all major site activities prior to the signing of the ROD. In addition to text, site maps usually help clarify the discussion.

Background Checklist	
Physical Characteristics <i>Present the site's location and characteristics, including:</i>	
	area of site, relation to parcel(s), extent and location of sources
	whether site contains or is near populated areas
	whether site contains or is near environmentally sensitive areas, where applicable
	whether site is near or related to any other Superfund sites, where applicable
Land and Resource Use <i>Discuss:</i>	
	former, current and projected land uses for the site, including the land use prior to any removal actions and immediately prior to cleanup
	current and projected land uses for the surrounding area
	human use of resources (such as groundwater or surface water as a drinking water supply) and any other current uses of the site not already covered
History of Contamination <i>Discuss:</i>	
	the historical activities that caused contamination, including the type of activity or process, when it took place, the specific type of hazardous substances, and their volumes/proportions, if known
	how contamination was discovered/problems resulting from contamination
Initial Response <i>Describe any pre-ROD cleanup activities at the site, and summarize contamination left onsite after their completion, for instance:</i>	
	CERCLA removal actions, non-CERCLA removals/responses, closures, the ceasing of operations, as well as governing agreements and parties involved in these activities

Background Checklist	
	if there are removal actions, summary statement of hazardous substances, pollutants, and contaminants left onsite
Contaminants Describe the contaminants found at the site by appropriate media type (soil, groundwater, surface water, air). Note the effect or potential effect of the contamination on people, resources they use, or the environment. Examples of elements of this discussion include:	
	date of NPL listing, where applicable
	contaminated media and structures (summary of remedial investigation)
	resources/targets that have been or could potentially be affected, results of risk assessments, determination of primary health threat

IV. Remedial Actions

Discuss initial plans, implementation history, and current status of the remedy. Explain events identified in the chronology, and generally include discussions of remedy selection, remedy implementation, and system operations/O&M. Present – accurately, adequately, and concisely – relevant site activities from the signing of the ROD to the present. Be sure to delineate all remedial measures. For instance, include monitoring, fencing, and institutional controls. Discuss any changes to or problems with remedial components.

Remedial Actions Checklist	
Remedy Selection Describe the remedial action objectives and the selected remedy. This discussion should explain:	
	source documents listing remedial action objectives and the remedy (e.g., RODs, ESDs), including signature/filing date
	definition of operable units (OUs), related to each ROD
	statement of remedial action objectives, related to each OU or ROD
	description of remedial actions/remedy, related to each OU or ROD, noting media addressed; all components of the remedy, including engineering controls, access controls, institutional controls, cleanup measures, treatment types, and required monitoring should be described
Remedy Implementation Discuss the history of and plans for implementation of the remedy. Discuss enforcement actions if applicable. The text may be presented either chronologically or by OU, and should include:	
	dates when remedial designs were started and completed
	difficulties or changes that occurred during remedial design
	dates when remedial actions were started and completed

Remedial Actions Checklist	
	the performance of each remedial action since implementation
	enforcement agreements, and parties involved in these agreements
	CERCLA removal actions or non-CERCLA removals/responses since the ROD
System Operations/O&M Describe system operations/O&M requirements, activities to date, any problems that have arisen, and costs:	
	system operations/O&M requirements as noted in the system operations/O&M plan, system operations/O&M manual, enforcement documents, and monitoring plans
	system operations/O&M activities to date
	problems in the implementation of system operations/O&M
	originally estimated annual O&M costs
	actual annual O&M costs over the review period
	reasons for any unanticipated or unusually high O&M costs
Progress Since the Last Five-Year Review Describe progress toward accomplishing recommendations and follow-up actions since the last five-year review was completed:	
	protectiveness statements from the last review
	recommendations and follow-up actions that have been accomplished since the last review
	results of implemented actions, including whether they achieved the intended effect
	recommendations and follow-up actions that have not been implemented, along with the reason why
	construction, completion, discontinuation of parts of the remedy since the last review

A table such as Table 2 should be used to document total annual system operations/O&M costs during the period preceding the given five-year review. Significant variations from anticipated costs or between operating years should be discussed in the text.

Table 2: Annual System Operations/O&M Costs

Dates		Total Cost rounded to nearest \$1000
From	To	

Table 3 below presents one approach for providing information on the recommendations and follow-up actions stated in the past review and subsequent actions. The accompanying text should also discuss why any recommendations and follow-up actions have not been implemented, and whether implemented actions achieved desired results.

Table 3: Actions Taken Since the Last Five-Year Review

Deficiencies from Previous Review	Recommendations / Follow-up Actions	Party Responsible	Milestone Date	Action Taken	Date of Action

At the end of the remedial actions section, it is sometimes helpful to add a brief discussion of the current status of each of the components of the remedy. This discussion can be particularly helpful for large, complex sites.

V. Five-Year Review Process

Detail the process/methods of the five-year review. Include information such as the following:

- Who the review team members were
- What community involvement activities took place
- What the tasks of this five-year review were (e.g., document review; interviews; site inspection; review of changes in standards and to be considered (TBCs); review of changes in exposure pathways, toxicity, and other contaminant characteristics; risk recalculation or risk assessment; data review)

VI. Five-Year Review Findings

Describe the information collected as part of the review. The purpose of this section is to document the information collected during each review task, which then provides the basis for the assessment of factors related to protectiveness in the next section.

Findings Checklist	
Interviews <i>Discuss:</i>	
	interviews conducted (name, title, organization, date)
	successes/problems in the implementation of access and institutional controls
	successes/problems with the construction of the remedy
	successes/problems with system operations/O&M
	unusual situations or problems at the site
Site Inspection <i>Summarize the site inspection and site conditions:</i>	
	date of site inspection (if more than one inspection was conducted to allow for monitoring or further inspection, list all inspections and activities conducted, and the reasons for conducting each inspection)
	who made or attended the inspection
	activities conducted
	summary of site conditions
Changes in Standards and To Be Considereds (TBCs) <i>Discuss and present:</i>	
	standards and TBCs reviewed
	changes in standards and TBCs
Changes in Exposure Pathways, Toxicity, and Other Contaminant Characteristics <i>Discuss and present:</i>	
	site-specific risk-based cleanup levels reviewed (i.e., cleanup levels set on the basis of a risk assessment rather than on ARARs)
	the reasons for and results of any risk recalculation
	the reasons for and results of any risk assessment
	whether changes in exposure pathways, toxicity, or other contaminant characteristics affect protective cleanup levels and/or the protectiveness of the remedy
Data Review <i>Discuss and present:</i>	
	what data were reviewed
	relevant trends and levels, noting levels which are not currently compliant and whether future compliance can be expected without additional action
	tables summarizing monitoring and sampling data

When a standard or requirement has changed, a table can be used to record the nature of the change. Tables 4, 5, and 6 demonstrate potential ways to note changes in chemical-specific, action-specific, or location-specific requirements, respectively.

Table 4: Changes in Chemical-Specific Standards

Contaminant	Media	Cleanup Level	Standard		Source/Year
			Previous	New	
Chemical A	e.g., groundwater	e.g., 0.XX mg/L	Previous	e.g., 0.XX mg/L	e.g., SDWA 1988
			New	e.g., 0.YY mg/L	e.g., SDWA 1995
Chemical B			Previous		
			New		

Table 5: Changes in Action-Specific Requirements

Action	Requirement		Prerequisite	Citation/Year
	Previous	New		
Action A (e.g., landfill)	Previous	Include original ARAR here; if none applies, state "None."		
	New			

Table 6: Changes in Location-Specific Requirements

Location	Requirement		Prerequisite	Citation/Year
	Previous	New		
Location A (e.g., critical habitat upon which endangered or threatened species depend)	Previous	Include original ARAR here; if none applies, state "None."		
	New			

The major data trends and observations necessary to depict site conditions should be summarized. Several approaches to presenting data are possible. One simplified example for groundwater monitoring wells is presented in Table 7 for illustration. The presentation and discussion of data should be grouped by media within each operable unit. Often it is helpful to present a graph demonstrating trends of concentrations over time in the text or as an attachment.

Table 7: Comparison of Initial and Current Groundwater Concentrations

Contaminant	Initial Highest Concentration (ppb)	Associated Well	Highest Concentration (ppb)	Associated Well

VII. Assessment

Explain the conclusions of the review, based upon the information presented in the previous section. As explained in Chapter 3, the assessment should focus on answering three key questions

- *Question A: Is the remedy functioning as intended by the decision documents?*
- *Question B: Are the assumptions used at the time of remedy selection still valid?*
- *Question C: Has any other information come to light that could call into question the protectiveness of the remedy?*

Each question, and the associated information to be discussed, is presented in its own checklist. Checklist items shown may be supplemented or modified based on site-specific circumstances.

Question A Checklist	
Compliance with the Health and Safety Plan (HASP)/Contingency Plan <i>Discuss:</i>	
	whether HASP/Contingency Plan is in place
	whether HASP/Contingency Plan is properly implemented to protect workers and mitigate short term threats
Implementation of Institutional Controls and Other Measures <i>Discuss:</i>	
	whether access controls are in place and prevent exposure (e.g., fencing and warning signs)
	whether institutional controls are in place and prevent exposure
	whether other actions (e.g., removals) necessary to ensure that immediate threats have been addressed are complete

Question A Checklist	
Remedial Action Performance <i>Discuss:</i>	
	whether the remedial action continues to be operating and functioning as designed
	whether the remedial action is performing as expected and cleanup levels are being achieved
	whether containment is effective
System Operations/O&M <i>Discuss:</i>	
	whether operating procedures, as implemented, will maintain the effectiveness of response actions
Cost of System Operations/O&M <i>Discuss:</i>	
	whether large variances in O&M costs could indicate a potential remedy failure or deficiencies
Opportunities for Optimization <i>Discuss:</i>	
	whether opportunities exist to improve the performance and/or reduce costs of monitoring, sampling, and treatment systems
Early Indicators of Potential Remedy Failure <i>Discuss:</i>	
	whether frequent equipment breakdowns or changes indicate a potential problem
	whether potential problems could lead to remedy failure or suggest protectiveness is at risk

Question B Checklist	
Changes in Standards and TBCs <i>Discuss:</i>	
	whether standards identified in the ROD have been revised and call into question the protectiveness of the remedy
	whether newly promulgated standards call into question the protectiveness of the remedy
	whether TBCs used in selecting cleanup levels at the site have changed and could affect the protectiveness of the remedy
Changes in Exposure Pathways <i>Discuss:</i>	
	whether land use or expected land use on or near the site changed
	whether human health or ecological routes of exposure or receptors have been newly identified or changed in a way that could affect the protectiveness of the remedy
	whether there are newly identified contaminants or contaminant sources
	whether there are unanticipated toxic byproducts of the remedy not previously addressed by the decision documents
	whether physical site conditions or the understanding of these conditions has changed in a way that could affect the protectiveness of the remedy
Changes in Toxicity and Other Contaminant Characteristics <i>Discuss:</i>	
	whether toxicity factors for contaminants of concern at the site have changed in a way that could affect the protectiveness of the remedy
	whether other contaminant characteristics have changed in a way that could affect the protectiveness of the remedy
Changes in Risk Assessment Methods <i>Discuss:</i>	
	whether standardized risk assessment methodologies have changed in a way that could affect the protectiveness of the remedy

Question C Checklist	
Other Information <i>Discuss:</i>	
	whether any other information has come to light which could affect the protectiveness of the remedy

VIII. Deficiencies

Detail shortcomings in current site operations, noting which inadequacies, if any, currently prevent the remedy from being protective. Table 8 can be used to note the identified deficiencies.

Table 8. Identified Deficiencies

Deficiencies	Currently Affects Protectiveness (Y/N)

IX. Recommendations and Follow-up Actions

Specify the required and suggested improvements to current site operations. Note the parties responsible for actions, milestone dates, and which agencies have oversight authority. At a minimum, address all deficiencies that currently affect protectiveness. Table 9 illustrates one way to include the necessary information.

Table 9. Recommendations and Follow-up Actions

Deficiencies	Recommendations/ Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Follow-up Actions: Affects Protectiveness (Y/N)

X. Protectiveness Statement(s)

Include one or more statements, along with a supporting discussion for each in the Protectiveness Statement(s) section. Address each OU in a separate paragraph. Then, for sites that have reached construction completion and have more than one OU, include an additional comprehensive protectiveness statement covering all of the remedies at the site. Suggested statements are as follows:

By OU

- *(For operable units with remedial actions under construction and/or operating remedial actions): The remedy at OU X is expected to be protective of human health and the environment upon completion, and immediate threats have been addressed.*
- *(For operable units with operating remedial actions where the remedy is not expected to meet current cleanup levels and remedial action objectives, but immediate threats have been addressed and there is no uncontrolled migration of contaminants): The remedy at OU X currently protects human health and the environment because (describe the elements of the remedy that protect human health and the environment in the short term.)*
- *(For operable units with completed remedial actions): The remedy at OU X is protective of human health and the environment.*

or

- *The remedy at OU X is not protective.*

Statement Covering All of the Remedies at the Site (for sites that have achieved construction completion)

- *Because the remedial actions at operable units x and y are protective/are expected to be protective, the remedy for the site is/is expected to be protective of human health and the environment.*

or

- *The remedial actions at operable units x and y, are protective. However, because the remedial action at operable unit z is not protective, the remedy for the site is not protective of human health and the environment at this time.*

Supporting Paragraphs

For the discussion supporting each statement, address the following as appropriate:

- *Containment effectiveness*
- *Cleanup goals met/levels of containment falling or not falling as needed to meet cleanup levels or revised levels*

- *Measures are or are not in place, and do or do not prevent exposure*
 - *HASP/Contingency Plans*
 - *Access controls*
 - *Institutional controls*

XI. Next Review

Discuss whether another five-year review is required, and appropriate timing. Include suggested tasks for the next review if appropriate.

XII. Other Comments (Optional)

The Other Comments section provides an opportunity to note any other conclusions or concerns that are not addressed elsewhere in the report.

Attachments

List of Documents Reviewed
Site Maps (if not included in the body of the report)
Tables and Figures Documenting Remedy Performance and Changes in Standards
(if not included in the body of the report)
Interview Report (if warranted)
Site Inspection Checklist
Photos Documenting Site Conditions

Appendix B
Sample Five-Year Review Report

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Five-Year Review Report

Second Five-Year Review Report for Sam Industries Site Quarryville Trail County, New State

August 1998

PREPARED BY:

**Region A
United States Environmental Protection Agency
Region City, Region State**

Approved by:

Date:

Jerry Shaw

8/3/1998

Jerry Shaw
Division Director
U.S. EPA Region A

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List of Acronyms

ARARs	Applicable or Relevant and Appropriate Requirements
CBL	Construction Builders Limited
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
ECI	Environmental Consultants Incorporated
GAC	Granular Activated Carbon
GETS	Groundwater Extraction and Treatment System
GPM	Gallons Per Minute
HASP	Health and Safety Plan
MCLs	Maximum Contaminant Levels
MSL	Mean Sea Level
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NSDHE	The New State Department of Health and Environment
O&M	Operation and Maintenance
OUs	Operable Units
QWD	Quarryville Water District
RALs	Risk Action Levels
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
SSC	Superfund State Contract
USACE	U.S. Army Corps of Engineers
VOCs	Volatile Organic Compounds

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Executive Summary

The second five-year review of the Sam Industries site in Quarryville, New State was completed in August 1998. The results of the five-year review indicate that the remedy is expected to be protective of human health and the environment. Overall, the groundwater treatment system and landfill cap remedial actions were functioning as designed, and for the most part were operated and maintained in an appropriate manner. A few deficiencies that do not immediately impact the protectiveness of the remedy were noted.

The protection of human health and the environment by the remedial actions at operable unit (OU) 1 and OU2 are discussed below. Both the Health and Safety Plan and the Contingency Plan are in place, sufficient to control risks, and properly implemented. Because the remedial action at OU1 is protective of human health and the environment and the remedial action at OU2 is expected to be protective of human health and the environment, the remedy for the site is expected to be protective of human health and the environment.

Operable Unit 1

The remedy at OU1 is protective of human health and the environment. The cap is effective at containing contaminants through preventing infiltration of rainwater and preventing direct contact with contaminated soils. There is no evidence of wetland degradation. Institutional controls at the landfill remain in place and are effective. Gaps in the fence at the site have been repaired and warning signs replaced. Repair of eroded bike paths on the cap is scheduled for completion this year. Future trespassing at the site will be prevented by security patrols.

Operable Unit 2

The remedy at OU2 is expected to be protective of human health and the environment, and immediate threats have been addressed. The groundwater and extraction and treatment system is operating and functioning as designed. Levels of contaminants are falling as needed to achieve cleanup levels within the time frame anticipated at the time of the record of decision, and an inward gradient has been established to limit the migration of the groundwater plume. Institutional controls are in place to prevent groundwater use downgradient of the plume.

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Five-Year Review Summary Form

SITE IDENTIFICATION

Site name (from WasteLAN): Sam Industries

EPA ID (from WasteLAN): NSDXXXXXXXXXX

Region: A

State: NS

City/County: Trail County

SITE STATUS

NPL status: Final Deleted Other (specify) _____

Remediation status (choose all that apply): Under Construction Operating Complete

Multiple OUs? YES NO

Construction completion date: 12/2/1990

Has site been put into reuse? YES NO

REVIEW STATUS

Reviewing agency: EPA State Tribe Other Federal Agency _____

Author name: John Doe

Author title: Remedial Project Manager

Author affiliation: EPA Region A

Review period: 3/17/1998 to 8/3/1998

Date(s) of site inspection: 5/15/1998

Type of review: Statutory

Policy

Post-SARA Pre-Sara NPL-Removal only

Non-NPL Remedial Action Site NPL State/Tribe-lead

Regional Discretion)

Review number: 1(first) 2 (second) 3 (third) Other (specify) _____

Triggering action:

Actual RA Onsite Construction at OU # ____

Actual RA Start at OU# ____

Construction Completion

Previous Five-Year Review Report

Other (specify) _____

Triggering action date (from WasteLAN): 8/10/1993

Due date (five years after triggering action date): 8/10/1998

Five-Year Review Summary Form

Deficiencies:

Four general deficiencies were identified:

- Evidence of site trespassing
- Damage to landfill cover
- Monitoring wells required maintenance
- Security measures required

None of these deficiencies currently cause the remedy to be not protective.

Recommendations and Follow-up Actions:

Two actions are required to correct these deficiencies and ensure that protectiveness is maintained in the future:

- Landfill cover should be permanently repaired
- Security services should be obtained

Protectiveness Statement(s):

The remedial action at operable unit 1 is protective, and the remedial action at operable unit 2 is expected to be protective. Because the remedial actions at both operable units are protective, the remedy for the site is protective of human health and the environment.

Other Comments:

Although trespassers riding dirt bikes have caused an area of erosion on the landfill cover, the geotech layer was not breached and so exposure to contaminants was still prevented. A temporary repair has been implemented and a permanent repair is scheduled to be completed. At the time of signature of this report, the fence has been repaired and warning signs have been replaced. The State has committed to identify funding for and obtaining private security services to prevent future trespassing. EPA will continue to monitor the inspection of the fence and the implementation of further measures, if necessary. A full system evaluation is scheduled within the next year.

Sam Industries Site Second Five-Year Review Report

I. Introduction

EPA Region A has conducted a second five-year review of the remedial actions implemented at the Sam Industries site in Trail County, New State. This review was conducted from March 1998 through August 1998. This report documents the results of the review. The purpose of five-year reviews is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in five-year review reports. In addition, five-year review reports identify deficiencies found during the review, if any, and identify recommendations to address them.

This review is required by statute. EPA must implement five-year reviews consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). CERCLA §121(c), as amended, states:

If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented.

The NCP part 300.430(f)(4)(ii) of the Code of Federal Regulations (CFR) states:

If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.

This is the second five-year review for the Sam Industries landfill. The triggering action for this review is the completion of the first five-year review on August 10, 1993. Due to the fact that hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unrestricted use and unlimited exposure, another five-year review is required.

II. Site Chronology

Table 1 lists the chronology of events for the Sam Industries site.

Table 1: Chronology of Site Events

Date	Event
1981	Initial discovery of the problem
3/82	Removal action
6/8/84	NPL listing
4/86	RI/FS complete
9/29/86	ROD signature
1/87	Remedial design start
1/15/88	Superfund State Contract
3/12/88	Remedial design completion
5/10/88	Operable unit 1 actual RA start
8/10/88	Operable unit 1 construction start
1/89	Operable unit 1 construction finish
5/6/89	Operable unit 2 construction start
10/10/90	Operable unit 2 construction finish
12/2/90	Construction completion
8/10/93	First five-year review report

III. Background

The Sam Industries landfill property occupies approximately 25 acres of land near Quarryville, Trail County, New State (see Figure 1 in Attachment 2). The landfill is located approximately one mile south of Quarryville and 10 miles northeast of Industrial City (see Figure 2 in Attachment 2). It is bounded to the east by County Road 329 and to the northwest by a rural residential area. The Trout River lies approximately one mile to the west of the landfill. Local groundwater flow is to the northwest. A 20-acre wetland borders the site to the north.

From the 1920s to the 1940s, approximately 12 acres of the property were used by Sam Industries as a gravel quarry. In the 1950s, Quarryville Municipality took over the property for use as a municipal landfill. Over the course of operations, approximately 75,000 tons of both municipal and industrial waste were disposed in the quarry, including wastes from an equipment repair and recycling business that has since gone out of business. Under an arrangement with the New State Department of Health and Environment (NSDHE), the landfill was closed in 1974 when a permitted facility became available for waste disposal.

In the summer of 1981, water samples were collected from Quarryville private wells as part of a State program to test rural water supplies. Elevated levels of volatile organic compounds (VOCs) were observed in three of the private wells located northwest of the landfill. NSDHE notified the affected residences and issued an alert on the local groundwater, suggesting that residents boil the water prior to consumptive use.

Groundwater flow direction and landfill location pointed to the landfill as the source of contaminants. A subsequent investigation of the landfill was conducted in 1981. The inspection discovered exposed waste and debris, including some drummed solvents. Analysis of onsite waste and soils indicated a variety of VOCs were present onsite.

Because site conditions warranted immediate action, four activities were performed under CERCLA Removal Authority as indicated below. Immediate actions were completed by September 20, 1982.

- Bottled drinking water was provided to affected residents until an alternate water supply could be provided.
- Work to extend and repair the property's perimeter fence so that the entire landfill was encompassed and isolated was initiated in March 1982 and completed on April 6, 1982. Access is controlled through a locked gate off of Route 329.
- Approximately 2,500 tons of surface wastes within the landfill were collected and either consolidated or disposed offsite at a RCRA-permitted facility between April and August 1982. Miscellaneous debris was consolidated within the southern portion of the landfill.
- Three hundred tons of drummed waste and other hazardous waste were sent to the Blue Mountain Landfill, a RCRA subtitle C facility in Smokey County, New State for disposal between June and September 1982.

In late spring of 1983, the Quarryville Water District (QWD) extended its system to ten residences between Sam Industries and the Trout River. These residences were connected to the system on September 25, 1983.

The site was proposed for the National Priorities List (NPL) in 1984, and was finalized on the NPL on June 8, 1984. Because no financially viable PRPs have been identified, the site is a Federal-lead, Fund-financed site.

The Remedial Investigation/Feasibility Study (RI/FS) was started in March 1985 and completed in April 1986. Sampling indicated VOC contamination in soils on and surrounding the landfill. Additionally, a plume of VOCs was delineated in the shallow groundwater aquifer,

emanating from the landfill and extending approximately one-half mile to the northwest. The contaminants of concern for the site are benzene, trichloroethylene, and vinyl chloride.

The landfill property is currently not being used for any residential, commercial, or municipal activities and there are no plans for future development or use. With the exception of the rural residential area northwest of the site, the surrounding areas are utilized for agricultural purposes and there are no plans for future development or use.

IV. Remedial Actions

A. Remedy Selection

The only record of decision (ROD) for the Sam Industries site was signed on September 29, 1986. The remedial action objectives are to

- Prevent direct contact with or ingestion of contaminated soils and groundwater;
- Eliminate contaminant loading to the groundwater;
- Prevent migration of contaminants via groundwater or surface water to adjacent wetlands;
- Control further migration of the contaminated groundwater;
- Recover, treat, and discharge impacted groundwater until the aquifer is restored and groundwater contamination is below action levels.

The remedy was separated into two operable units (OUs): one to address the soil contamination – OU1; and one to address groundwater contamination – OU2. The remedial actions at OU1 are

- A RCRA subtitle C compliant cap above the landfill;
- A slurry wall;
- Surface water diversion and control;
- Institutional controls through deed restrictions on the landfill.

The remedial actions at OU2 are

- Groundwater extraction and treatment;
- Semi-annual monitoring of the groundwater during remediation, followed by biannual monitoring for ten years.

The groundwater extraction and treatment system (GETS) is anticipated to operate 20 years before achieving cleanup levels. The treatment system will be turned off when the groundwater meets the cleanup levels for three consecutive months. The identified cleanup level of 1 ppb for all organic contaminants was based on the State groundwater standards.

B. Remedy Implementation

The remedial design for the site was started in January 1987 and completed by U.S. Army Corps of Engineers (USACE) on March 12, 1988. The plans called for the two OUs to be constructed successively. Construction on OU2 was delayed until after the completion of OU1, to ensure that the system piping would not be damaged by the capping emplacement equipment.

EPA signed a Superfund State Contract (SSC) with the New State Bureau of Environmental Remediation on January 15, 1988, in which the State provided assurances for State operation and maintenance (O&M) responsibilities.

The USACE contracted with Construction Builders Limited (CBL) to construct the selected remedies. Construction on the RCRA subtitle C compliant cap at OU1 began on August 10, 1988 (this action triggered the initial five-year review). In accordance with the design, the landfill surface was regraded to provide surface water drainage control to divert runoff from the cap to the wetlands area. The landfill cover system was composed of, in order from top to bottom, a 6-inch topsoil layer, an 18-inch vegetation support layer, a geocomposite drainage layer, a 40-mil HDPE geomembrane, a geosynthetic clay liner, and a foundation layer. The cover was seeded with native grasses. A slurry wall was installed along the northern boundary of the site between the landfill and the wetland area. Drainage ditches constructed around the landfill's perimeter discharge run-off from the cover to the wetland. Passive gas vents extend through the cover system at a frequency of approximately one per acre or about 200 feet on-center. Other features of the remedial design included new access roads and realignment of the site's perimeter fence.

Field construction work was completed in January 1989. Because of seasonal conditions, an inspection of OU1 was not conducted until March 22, 1989. This inspection found that vegetation was starting to become established, but that there were some signs of erosion in the

cover, particularly in the southern slopes. CBL addressed the erosion by replacing the soil cover and reseeded. A final inspection on May 9, 1989 found that the problems had been corrected.

Work on OU2 began on May 6, 1989. Three extraction wells, three new monitoring wells, a pump house, and the pumping system were constructed. The system includes five previously installed monitoring wells. The system is designed to extract approximately 45 gallons per minute (gpm), with treatment by air stripping followed by granular activated carbon (GAC). The treated water is discharged to the storm water system under a National Pollutant Discharge Elimination System (NPDES) permit. EPA and NSDHE receive monthly discharge sampling results.

The treatment system was successfully tested in September 1990 and brought to full operation on October 10, 1990.

Institutional controls were adopted by the Quarryville City Council on October 28, 1990. The city placed a permanent deed restriction on the Sam Industries site, preventing excavation within the landfill. The QWD placed temporary restrictions on groundwater use in the areas between the site and the Trout River on November 12, 1990.

The site achieved construction completion status when the Preliminary Close Out Report was signed on December 2, 1990.

C. System Operations

("System operations" encompasses the same tasks as operation and maintenance. This document refers to "system operations" in cases where these activities are considered part of the remedial action, for example at Long-Term Response Actions. Thus, this sample report addresses system operations.)

USACE originally contracted with Environmental Consultants Incorporated (ECI) to perform operation and maintenance activities for the entire site for a one year period following remedy construction. ECI's contract with USACE was modified after the one-year period to include only GETS O&M (OU2) and was extended to October 2000. The revised contract covers the 10-year period of EPA-funded GETS O&M. NSDHE retained ECI in 1991 to perform O&M for the landfill cover system (OU1). ECI has been the sole O&M contractor for this site to date.

The work is being conducted in accordance with the approved O&M Plan. System operations requirements for the Sam Industries site include

- Twice yearly mowing and inspections of the landfill cap and surface water drainage system;

- Weekly inspections of the pumping operations;
- Weekly monitoring of GETS influent, air stripper effluent, and GAC midpoint and effluent;
- Biannual sampling of the groundwater monitoring wells;
- Ongoing maintenance of the landfill cap;
- Ongoing maintenance of the GETS system.

Cap system maintenance has generally been limited to routine semiannual mowings, periodic weed control and woody vegetation removal, fence repair, rodent control, and occasional repair of minor erosion areas. No significant repairs of the cover system have been required since construction.

During the first five-year review period, ECI reported some operational problems and some minor maintenance issues with the GETS. Encrustation and channeling due to high natural iron levels in groundwater caused early breakthrough in the GETS lead carbon unit. After conversations between the State and ECI, an additional carbon unit was added which can be operated in parallel or in series with the other units to reduce the frequency of service requirements and to allow for easier servicing. The GAC units have functioned properly since the upgrade in February 1992.

O&M costs ran about 6% higher than the original estimate of \$63,500 (March 1988) during the first year due to frequent maintenance. Routine costs were less the following year, however, the purchase of an additional carbon unit raised overall costs by \$14,500. Costs for the following years were at a level that would be considered in an acceptable range. Some additional costs were incurred in 1998 for extraction well pump replacements. One pump failed. Due to the age, all three were pulled for service, and all three were replaced. Other non-routine maintenance in 1998 included redevelopment of the extraction wells during the pump replacements. Table 2 lists annual costs for the site.

Another problem is that trespassers have been riding dirt bikes over a corner of the landfill cover and have eroded the soil portion of the cap. This area has been repaired twice.

Table 2: Annual O&M Costs

Dates		Total Cost rounded to nearest \$100
From	To	
10/90	10/91	\$67,600.00
10/91	10/92	\$78,200.00
10/92	10/93	\$65,900.00
10/93	10/94	\$66,300.00
10/94	10/95	\$66,000.00
10/95	10/96	\$66,200.00
10/96	10/97	\$69,500.00
10/97	10/98	\$76,400.00

D. Progress Since the Last Five-Year Review

During the first five-year review, the remedy was found to be protective of human health and the environment, however some deficiencies were noted. These deficiencies did not affect protectiveness, but did require correction. They included the fact that the O&M manual and as-built drawings had not been updated to show the additional carbon unit and piping installed during the second year of operation; some small trees that were growing in the capped area; and silt accumulation in the drainage structures. All of these deficiencies were corrected as noted in Table 3 below.

Table 3: Actions Taken Since the Last Five-Year Review

Deficiencies from Previous Review	Recommendations / Follow-up Actions	Party Responsible	Milestone Date	Action Taken	Date of Action
Trees growing in cap	Remove trees from cap	State	9/30/93	Trees cut, cap mowed	8/15/93
Silt accumulation in drainage structures	Clean out drainage structures	State	9/30/93	All drainage structures cleaned of silt deposits	8/30/93

Deficiencies from Previous Review	Recommendations / Follow-up Actions	Party Responsible	Milestone Date	Action Taken	Date of Action
O&M manual and as-built drawings do not show additional carbon unit and piping	Update O&M manual and as-built drawings	EPA via USACE	12/31/93	Updated O&M manual and as-built drawings submitted with annual report	12/31/93

V. Five-Year Review Process

The Sam Industries five-year review was led by John Doe, Remedial Project Manager for the Sam Industries site. The following team members assisted in the review:

- Victoria Simpson, USACE Construction Manager
- Mark Rolf, EPA Community Involvement Coordinator
- Octavia Pasquales, EPA Hydrogeologist
- Larry Klein, NSDHE Representative

This five-year review consisted of the following activities: a review of relevant documents (see Attachment 1); interviews with local government officials and representatives of the construction and the operations contractors; and a site inspection. In addition, a notice regarding the forthcoming review was placed in the local newspaper. The completed report is available in the information repository. Notice of its completion will be placed in the local newspaper and local contacts will be notified by letter. A brief summary of this report will be distributed to community members.

VI. Five-Year Review Findings

A. Interviews

The following individuals were contacted by telephone as part of the five-year review:

- John Jones, Superintendent, QWD (Interviewed 4/21/98)

- Barbara Chung, Council President, Quarryville City Council (Interviewed 4/17/98)
- Steve Malino, Police Chief, Quarryville Police (Interviewed 4/17/98)
- Christina Stelton, City Planner, Quarryville Planning Department (Interviewed 4/20/98)
- Leslie Smith, O&M Coordinator, ECI (Interviewed 4/16/98 & 5/14/99)

Mr. Jones stated that QWD was unaware of any issues related to the GETS discharge and that the discharge facility has had no NPDES violations. He noted that groundwater use restrictions remain in place. He also stated that community interest about the site remains high. The area residents seem to be confident that the water they receive through the municipal supply is safe. However, some residents prefer individual well water over municipal water and would like the aquifer restored more quickly.

Ms. Chung stated that the City Council has received complaints about trespassing at the site. These complaints have been referred to the Quarryville Police Department. Ms. Smith noted that ECI had also contacted the police department about the trespassing problem. Mr. Malino stated that trespassing of this nature is common at open remote areas such as the landfill and that his department did not have the resources to provide regular patrols outside the business and residential area of Quarryville. However, the police would respond to specific complaints and agreed to irregular patrols of the site at other times. He recommended the site obtain private security for regular patrols if deemed necessary.

Ms. Stelton confirmed that no changes in land use were planned for the site, and confirmed that deed restrictions for the site were recorded.

B. Site Inspection

Representatives of EPA, NSDHE, USACE, and ECI took part in a site inspection on May 15, 1998. During the site inspection, remedial systems were inspected and groundwater monitoring efforts were observed. The inspection evaluated the landfill cap, the groundwater treatment system, the surface water drainage system, and site fencing. A summary of the inspection findings is presented below. Refer to Appendix E for the site inspection checklist which details inspection findings.

Conditions during the inspections were favorable with mild temperatures and no precipitation. Measurable precipitation had not been recorded at the site for at least 10 days prior to the inspection. The site vegetation had been recently mowed which facilitated inspection of the cap and adjacent areas.

The landfill cap was found to be in good condition. The vegetative cover was thorough and abundant, with no distressed areas, trees or shrubs. No noticeable depressions, excessive cracks, leachate seeps, odors, or other indications of distress were noted. ECI indicated that no significant ponding has been observed on the cap. There was some evidence of several small rodent burrows on the south side of the cap. The burrows were generally less than 18 inches deep and no geosynthetics were damaged or waste exposed. ECI indicated that they have an ongoing rodent control program. Once burrows are identified, they are backfilled with equivalent cap material and, if necessary, repellants are used to discourage further rodent activity. An approximately one acre area on the northeast side of the cap has several bike path ruts that were up to approximately three-inches deep. The geosynthetics were not damaged and no waste was exposed in these areas. ECI indicated that bikers have been a continuing problem for the last year or two and that ECI tries to control trespassing with periodic day patrols. However, since the site is not continuously staffed, these efforts have not had the desired results. ECI repairs the ruts when they exceed a few inches in depth by backfilling with equivalent cap material and reseeding. Repairs are usually pursued in the spring or fall to enhance revegetation efforts. Due to the on-going activity, repairs are required on a continuing basis.

In the north portion of the site, the fence had been breached in two sections and warning signs were missing. No vandalism was evident, however, the lock was missing from one monitoring well and the cover was cracked on another.

No other deficiencies of the cover system or appurtenant structures, including drainage channels and access roads, were noted. With the exception of the rodent holes and bike path ruts, no intrusive activities were noted on the cover system and no landfill waste or other contaminants were exposed or appeared likely to be exposed.

The groundwater treatment system was found to be operating and functioning properly. All groundwater extraction well covers were intact and locked, with no signs of damage. The pumps were withdrawing water from the three extraction wells at an average combined rate of 43 gpm. Visual inspection of the pumps and treatment system showed limited signs of wear and minimal rust. No problems or odors were observed associated with the air stripper. ECI reported that the system had not experienced problems since the installation of the additional carbon unit. The as-built drawings and O&M manual have been updated to reflect the installation of the carbon unit and new piping and valves required to operate it.

The site inspection was coordinated with the sampling schedule to observe collection of samples from the treatment system and the groundwater monitoring wells. Samples were collected in accordance with the O&M plan and were observed to be colorless and odorless. The laboratory results are discussed in the data review section below.

The ECI representative, Ms. Smith, stated that most ongoing activities were operating smoothly. At the time of the inspection, ECI had not forwarded a copy of the 1997 annual O&M report to EPA. A copy was subsequently received and reviewed for this report.

C. Risk Information Review

(Note: The ARARs below are hypothetical examples and do not represent actual Federal or State requirements.)

The following standards were identified as applicable or relevant and appropriate requirements (ARARs) in the ROD. They were reviewed for changes that could affect protectiveness:

- Safe Drinking Water Act (40 CFR Parts 141-146)
- Resource Conservation and Recovery Act (40 CFR Part 264)
- Clean Water Act (40 CFR Parts 130-138)
- Clean Water Act (40 CFR Parts 231-232)

In addition, the following newly promulgated standards were reviewed to check whether any new requirements could affect protectiveness:

- New State Groundwater Rule XXXX.XX
- New State Wetlands Rule YYYY.YY

Standards for the contaminants of concern have not become more stringent since the signing of the ROD in 1986. Federal standards have not changed. In 1996, the NSDHE promulgated new standards for groundwater contaminant concentration Risk Action Levels (RALs). These new groundwater standards rely upon health-based risk limits for groundwater consumption, based upon levels that can be safely consumed daily for a lifetime. The result of these new regulations has been to increase the allowed concentration of benzene in water supplies, as shown in Table 4 below. This change does not currently affect protectiveness, because the current cleanup level for benzene is conservative, and remains within the risk range. Cleanup levels for all the contaminants of concern are lower than current standards.

Table 4: Changes in Chemical-Specific Standards

Contaminant	Media	Cleanup Level	Standard		Source/Year
			Previous	New	
Benzene	groundwater	1.0 ppb	Previous	5.0 ppb	EPA MCL, 1986
			New	10.0 ppb	New State RAL, 1996
Trichloroethylene	groundwater	1.0 ppb	Previous	5.0 ppb	EPA MCL, 1986
			New	5.0 ppb	New State RAL, 1996
Vinyl Chloride	groundwater	1.0 ppb	Previous	2.0 ppb	EPA MCL, 1986
			New	2.0 ppb	New State RAL, 1996

Action-specific requirements, governing actions such as the construction of landfills, have not changed since the signing of the ROD. These requirement are called for by the Resource Conservation and Recovery Act.

There was one change in a location-specific requirement, however this change does not affect the requirements for this site. State wetlands regulations changed the minimum acreage regulated from 5 to 10 acres, as shown on Table 5 below. Under this change, the 20-acre wetland adjacent to the site would still fall within Federal regulation. This change does not affect protectiveness.

Table 5: Changes in Location-Specific Requirements

Location		Requirement	Prerequisite	Citation/Year
Wetlands	Previous	Actions to minimize adverse effects to wetlands	5 acres	New State Rule YYYY.YY, 1985
	New	Actions to minimize adverse effects to wetlands	10 acres	New State Rule YYYY.YY, amended 1994

D. Data Review

A review of records and monitoring reports through July 30, 1998, indicates that approximately 260 million gallons of water have been treated since startup, removing over 2,225 pounds of VOC contaminants. Pumping rates have remained essentially constant.

The major contaminants and maximum concentrations in the groundwater are summarized in Table 6 below. The data show that contaminant concentrations have decreased, with natural

variation in concentrations. However, at the present time all compounds still remain elevated above ROD-specified cleanup levels. A figure showing VOCs levels can be found in Attachment 3.

The GETS sampling data from the site inspection are presented in Table 7. The data show that the treatment system is currently removing contaminants to below detection levels. A review of the weekly sampling information, provided in the annual O&M reports, shows that the treatment system has been effective at removing contaminants below maximum contaminant levels (MCLs).

An inspection of water level data, summarized in Table 8, indicates that the inward gradient has been established and maintained. As mentioned in the first five-year review, the apparent data discrepancy – after four years some water elevations [above mean sea level (MSL)] were higher than or the same as before pumping – can be attributed to drier hydrogeologic conditions in 1988 and wetter conditions in 1993.

Table 6: Comparison of Initial and Current Groundwater Concentrations

Contaminant	Well	1988 Highest Concentration (Pre-Remedial) (ppb)	1993 Highest Concentration (ppb)	1998 Highest Concentration (ppb)	Cleanup Level (ppb)
Benzene	EW-2	627	112	80	1
Trichloroethylene	EW-2	243	48	36	1
Vinyl Chloride	EW-2	32	5	4	1

EW = Extraction well

Table 7: Treatment System Concentrations on April 15, 1998

Contaminant	GETS Influent (ppb)	Air Stripper Effluent (ppb)	GETS Effluent (ppb)
Benzene	80	14	ND
Trichloroethylene	36	4.0	ND
Vinyl Chloride	5	ND	ND

ND = Non-detect

Table 8: Groundwater Elevation Comparison

Well	1988 Elevation (Ft. MSL)	1993 Elevation (Ft. MSL)	1998 Elevation (Ft. MSL)
MW-1	1564.87	1564.92	1564.89
MW-2	1561.50	1563.21	1561.32
MW-3	1558.16	1560.07	1558.24
MW-4	1557.09	1557.12	1557.13
MW-5	1558.20	1558.24	1558.19
MW-15	1565.31	1568.28	1565.31
MW-16	1567.25	1569.09	1567.15
MW-17	1559.18	1558.21	1558.19

A review of the Health and Safety Plan (HASP) and Contingency Plan indicates that both are in place and sufficient to control risks at the site. Further, both plans are being properly implemented.

In summary, the remedial action objective of preventing direct contact or ingestion of contaminated soils and groundwater continues to be met by the intact cap, as well as by the provision of an alternate water supply under a removal action prior to the ROD. Monitoring results show decreased concentrations of contaminants at extraction and monitoring wells which indicates that contaminant loading to groundwater has substantially decreased. Contaminant levels are falling at a rate that will achieve aquifer restoration within the project time frame of 20 years. Further migration of contaminated groundwater is controlled through the establishment of an inward gradient in groundwater flow. Monitoring results indicate the GETS is meeting effluent cleanup levels for all three contaminants of concern: benzene, trichloroethylene, and vinyl chloride.

VII. Assessment

The following conclusions support the determination that the remedy at the Sam Industries site is expected to be protective of human health and the environment upon completion.

Question A: Is the remedy functioning as intended by the decision documents?

- **HASP/Contingency Plan:** Both the HASP and the Contingency Plan are in place, sufficient to control risks, and properly implemented.

- **Implementation of Institutional Controls and Other Measures:** The State needs to provide security services for the site to prevent further trespassing and erosion. The fence needs to be maintained. Institutional controls are in place and no current or planned changes in land use at the site suggest that they are not effective.
- **Remedial Action Performance:** The landfill cover system has been effective in isolating waste and contaminants. As previously discussed, some minor erosion/rutting has occurred on the cap but it does not affect the performance or integrity of the cover system. The GETS system is meeting cleanup levels and an inward gradient has been established. The cap is in need of a permanent repair of eroded areas. There is no evidence of wetland deterioration due to the site. These factors indicate that the remedial actions continue to be effective and that the GETS continues to be operating and functioning as designed.
- **System Operations/O&M:** System operations procedures are mostly consistent with requirements. Difficulties that have occurred with the GETS to date have been handled properly. More attention to cap repair and maintenance is necessary.
- **Cost of System Operations/O&M:** As noted above in Section IV, costs for the most part have been within an acceptable range. Costs have been higher when an additional carbon extraction unit and extraction well pump replacements were installed. These problems have been handled properly.
- **Opportunities for Optimization:** Given the adequate performance of the GETS, this five-year review does not identify a need for optimization at this time. The initial sampling frequency of quarterly was already reduced to biannually after the first year of operation in accordance with the long-term monitoring plan. Further reduction in sampling frequency is not called for at this time.
- **Early Indicators of Potential Remedy Failure:** No early indicators of potential remedy failure were noted during the review. Costs and maintenance activities have been consistent with expectations considering the addition of a carbon unit to the GETS.

Question B: Are the assumptions used at the time of remedy selection still valid?

- **Changes in Standards and To Be Considered:** This five-year review identified State Risk Action Levels that had been promulgated since the ROD was signed. However, these new health-based standards do not increase the stringency of the contaminant concentrations that the GETS must meet. Also, State wetlands regulations have changed, but do not affect protectiveness since the adjacent wetland is still under Federal regulation.

- ***Changes in Exposure Pathways:*** No changes in the site conditions that affect exposure pathways were identified as part of the five-year review. First, there are no current or planned changes in land use. Second, no new contaminants, sources, or routes of exposure were identified as part of this five-year review. Finally, there is no indication that hydrologic/hydrogeologic conditions are not adequately characterized. The rate of decrease of contaminant levels in groundwater is consistent with expectations at the time of the ROD, and the groundwater plume has been successfully contained.
- ***Changes in Toxicity and Other Contaminant Characteristics:*** Toxicity and other factors for contaminants of concern have not changed.
- ***Changes in Risk Assessment Methodologies:*** Changes in risk assessment methodologies since the time of the ROD do not call into question the protectiveness of the remedy.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No additional information has been identified that would call into question the protectiveness of the remedy.

VIII. Deficiencies

Deficiencies were discovered during the five-year review and are noted in Table 9. None of these are sufficient to warrant a finding of not protective as long as corrective actions are taken.

Site access has not been adequately controlled, allowing trespass and dirt biking which eroded a portion of soil cover of the cap. Repairing the areas where small animal burrows were observed will also be necessary to prevent deterioration of the cap.

Other minor deficiencies include one monitoring well missing a lock and another with a cracked cover.

Table 9: Identified Deficiencies

Deficiencies	Currently Affects Protectiveness (Y/N)
Evidence of Site Trespassing	
Trespass has occurred in the northern portion of the site.	N
Damage to Landfill Cover	
Animal burrows not repaired.	N
Eroded areas.	N
Monitoring Wells Require Maintenance	
Monitoring well missing lock.	N
Monitoring well with cracked cover.	N
Security Measures Required	
Two breaches in site fencing.	N
Warning signs missing.	N

IX. Recommendations and Follow-up Actions

At the time of the site inspection, EPA recommended that ECI repair the cap and address trespassing by repairing the site fence and replacing the warning signs. EPA recommended that the State obtain security services to prevent future trespassing. It was also recommended that small animal burrows be repaired and the monitoring wells be repaired and locked. Fence repairs, sign replacements, and animal burrow repairs have been completed with notice of completion sent to both NSDHE and EPA. Repair of erosion areas has been scheduled for completion before the next annual report, which is due in December 1998. The State has agreed to identify funding and obtain private security services for regular patrols as soon as possible but no later than September 30, 1998. The recommendations and follow-up actions are outlined in Table 10 below.

Table 10: Recommendations and Follow-up Actions

Deficiencies	Recommendations/ Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Follow-up Actions: Affects Protectiveness (Y/N)
Evidence of site trespassing	Address site access by repairing the site fence and replacing warning signs.	State	EPA	6/30/98	N
Damage to landfill cover	Repair cap.	State	EPA	before next annual report (12/98)	N
	Repair animal burrows.	State	EPA	6/30/98	N
Monitoring wells require maintenance	Repair and lock monitoring wells.	State	EPA	6/30/98	N
Security measures required	Obtain security services to prevent future trespass.	State	EPA	9/30/98	N

N/A - Not Applicable

X. Protectiveness Statements

The protection of human health and the environment by the remedial actions at OU1 and OU2 are discussed below. Both the HASP and the Contingency Plan are in place, sufficient to control risks, and properly implemented. Because the remedial action at OU1 is protective of human health and the environment and the remedial action at OU2 is expected to be protective of human health and the environment, the remedy for the site is expected to be protective of human health and the environment.

Operable Unit 1

The remedy at OU1 is protective of human health and the environment. The cap is effective at containing contaminants through preventing infiltration of rainwater and preventing direct contact with contaminated soils. There is no evidence of wetland degradation. Institutional controls at the landfill remain in place and are effective. Gaps in the fence at the site have been repaired and warning signs replaced. Repair of eroded bike paths on the cap is scheduled for completion this year. Future trespassing at the site will be prevented by security patrols.

Operable Unit 2

The remedy at OU2 is expected to be protective of human health and the environment, and immediate threats have been addressed. The GETS is operating and functioning as designed. Levels of contaminants are falling as needed to achieve cleanup levels within the time frame anticipated at the time of the ROD, and an inward gradient has been established to limit the migration of the groundwater plume. Institutional controls are in place to prevent groundwater use downgradient of the plume.

XI. Next Review

This is a statutory site that requires ongoing five-year reviews. The next review will be conducted within five years of the completion of this five-year review report. The completion date is the date of the signature shown on the signature cover attached to the front of the report.

XII. Other Comments

The activities at this site will be transferred to New State in the fall of 2000, as per the requirements of the Superfund State Contract.

**Attachment 1
Documents Reviewed**

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Documents Reviewed

“Emergency Response Action Report for Sam Industries,” US EPA Region C, OSC Joe Friday, December 1982.

“Final Remedial Investigation and Feasibility Study: Sam Industries Site,” prepared for US Army Corps of Engineers, Industrial City, New State by EnvCorp, Industrial City, New State, April 14, 1986.

CERCLA Record of Decision for Sam Industries Site, Quarryville, Trail County, New State, September 29, 1986.

“Final Remedial Design Report: Sam Industries Site,” prepared for US Army Corps of Engineers, Industrial City, New State by EnvCorp, Industrial City, New State, December 12, 1987.

Superfund State Contract #AP91-C014, Issued for Remedial Action cost-share, Sam Industries Site, Quarryville, Trail County, New State, January 15, 1988.

“Final Close-Out Report: Sam Industries Site,” prepared for US EPA Region C, by Construction Builders Limited, Granite Rock, New State, December 2, 1990.

“First Five-Year Review Report for the Sam Industries Site.” US EPA Region A, August 10, 1993.

“Annual Operation and Maintenance Report, 1994, Sam Industries Site,” prepared for US EPA Region C, by Environmental Contractors, Inc., Streamville, New State, October 15, 1994.

“Annual Operation and Maintenance Report, 1995, Sam Industries Site,” prepared for US EPA Region C, by Environmental Contractors, Inc., Streamville, New State, October 16, 1995.

“Annual Operation and Maintenance Report, 1996, Sam Industries Site,” prepared for US EPA Region C, by Environmental Contractors, Inc., Streamville, New State, October 13, 1996.

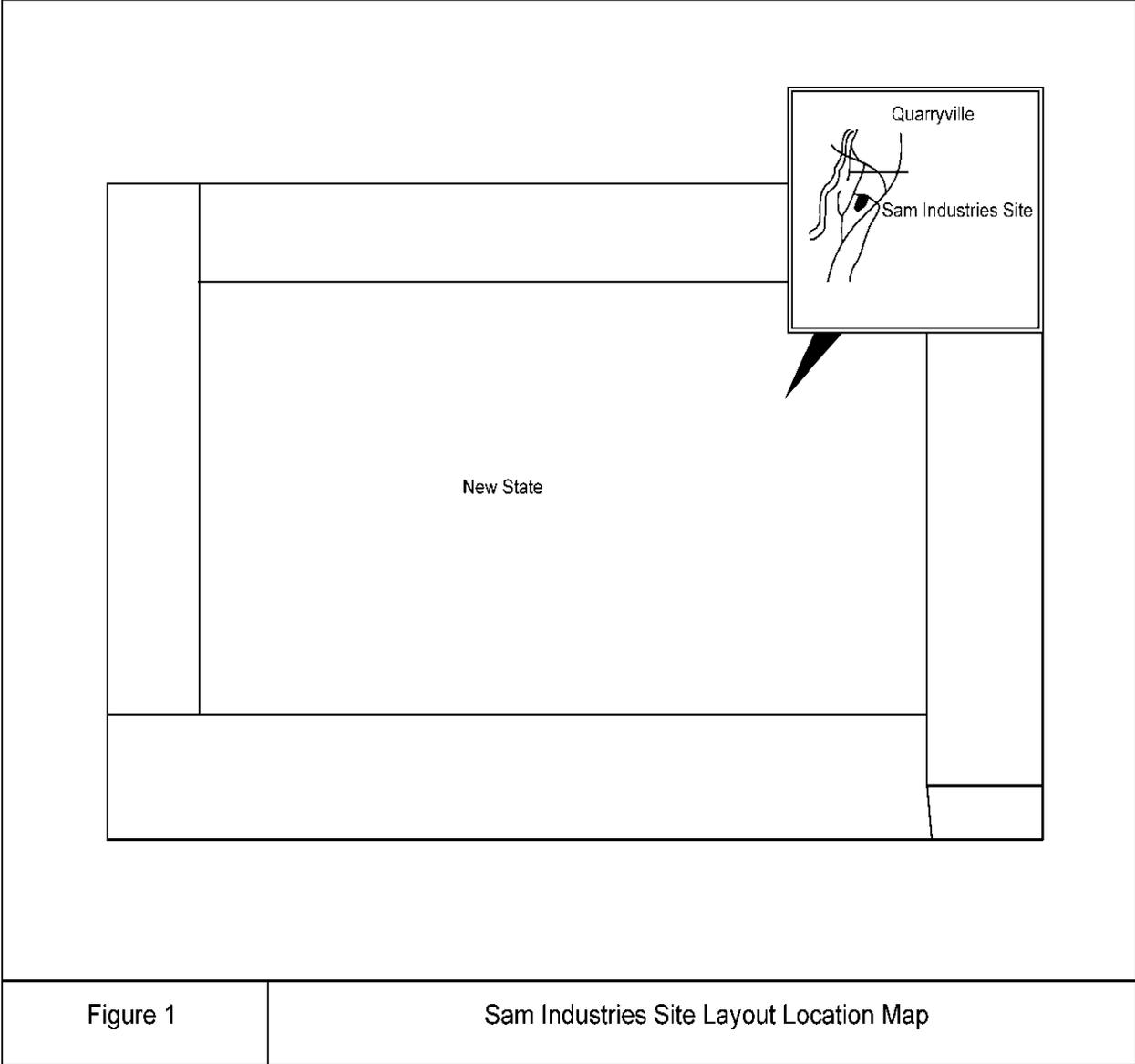
“Annual Operation and Maintenance Report, 1997, Sam Industries Site,” prepared for US EPA Region C, by Environmental Contractors, Inc., Streamville, New State, October 15, 1997.

“Annual Operation and Maintenance Report, 1998, Sam Industries Site,” prepared for US EPA Region C, by Environmental Contractors, Inc., Streamville, New State, October 12, 1998.

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**Attachment 2
Site Maps**

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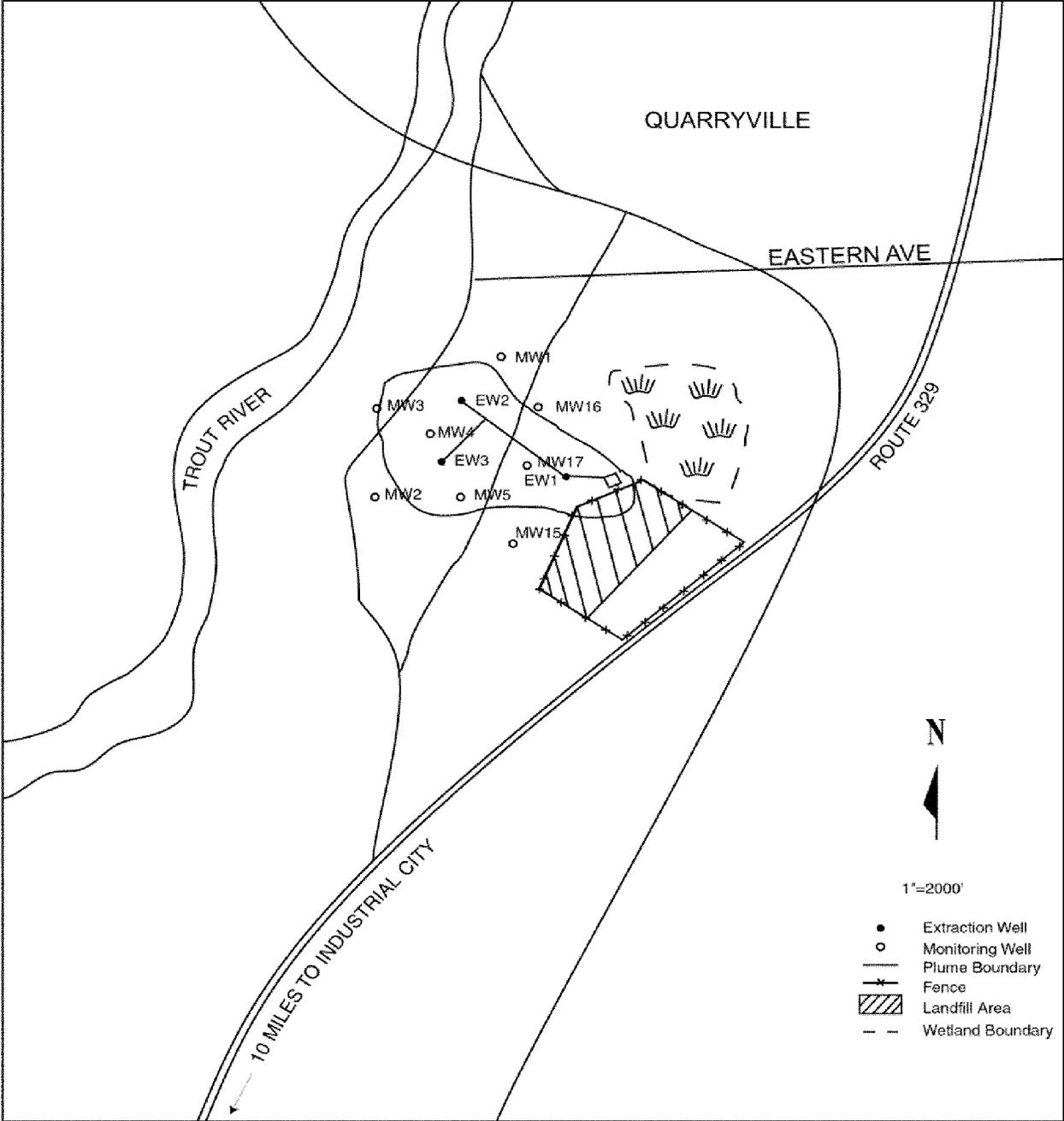
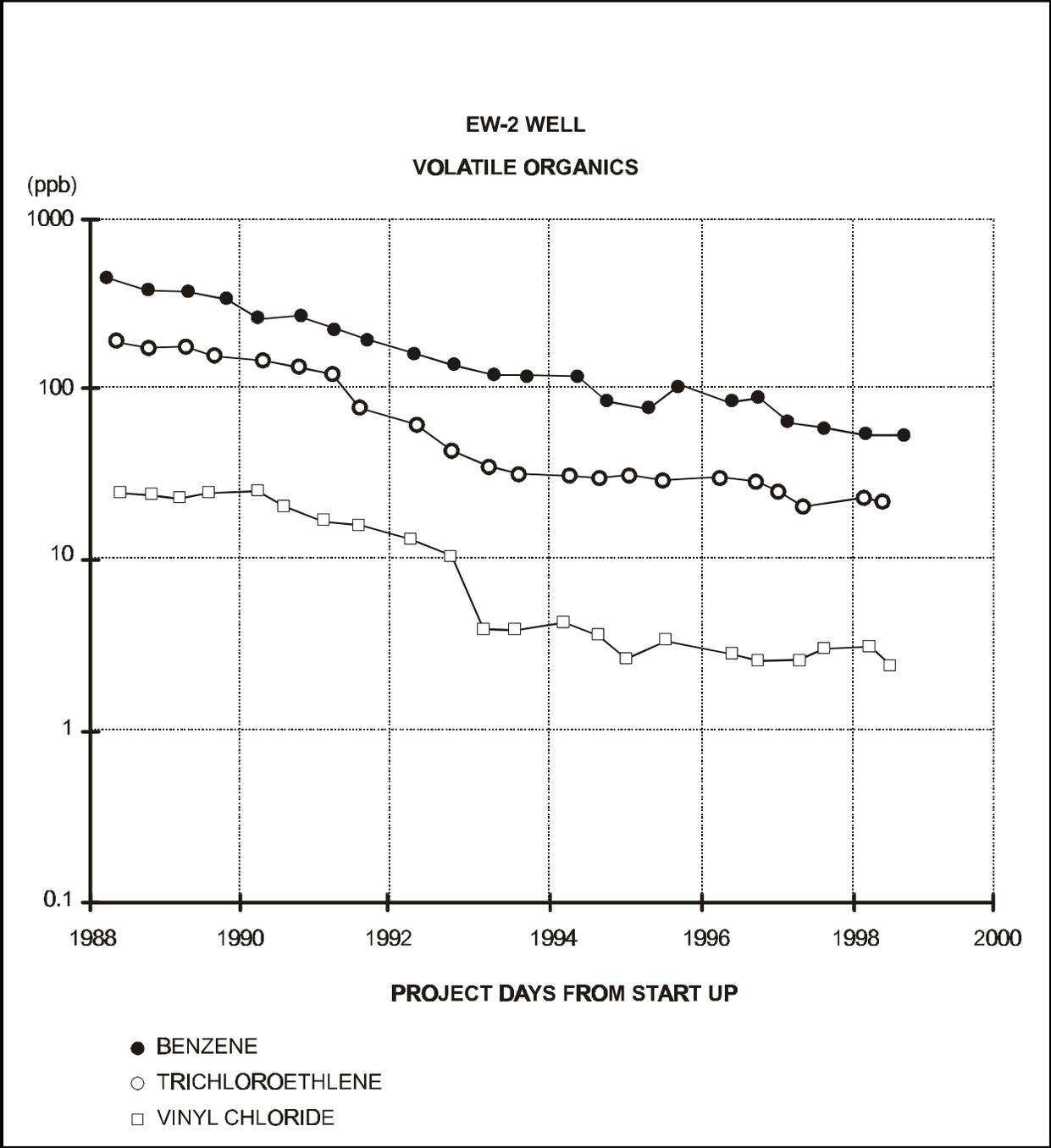


Figure 2 Sam Industries Site Layout Map

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Attachment 3
Graphic: Sampling Data Results

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Note: This graphic is included as an example. Separate graphics can be provided for each well at which there are significant trends or patterns.

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Appendix C
Document Review

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Document Review

The following five sections provide examples of potential documents to be reviewed as part of a five-year review. Each section addresses a different aspect of the implementation of the remedy, including the remedy decision, remedy implementation, operation and maintenance (O&M), legal documentation, and community involvement. Documents commonly reviewed are shown in a table in each section. Every site is different, so it may be necessary to review additional documents, such as relevant Memoranda of Understanding, to fully understand the remedial actions at a site. The tables and text below should be used as a guide.

The following is a list of some of the kinds of information that you can gather through a document review:

- Basis for the Response Action
- Implementation of the Response
- Operation and Maintenance
- Legal Documentation
- Community Involvement

Each of these areas is discussed below.

Basis for the Response Action

Remedy decision documents, and Federal and State laws and regulations, provide the basis upon which the remedy was selected or modified. The documents in the table below identify the background and goals of the remedy and any changes in laws and regulations that may affect the remedy. Other sources of remedy decision information are the Remedial Investigation/Feasibility Study (RI/FS), toxicological and chemical characteristics databases, transcripts of public meetings, and “to be considereds.”

Non-remedial responses have other types of documentation. For instance, removals frequently are documented through an Action Memorandum. You should adapt your review of those documents to the circumstances at your site.

Document	Purpose of Document	Use During the Five-Year Review
Decision Documents – RODs – ROD Amendments – Explanations of Significant Differences – Action Memoranda	– records remedial decision or other actions, and significant changes from the original remedy	– goals of the remedy – background information on the site – basis for action – cleanup levels and applicable or relevant and appropriate requirements (ARARs) – community concerns and preferences
Federal Environmental Laws and Regulations	– statutory and regulatory requirements that may affect the judgement as to whether the remedy protects human health and the environment	– changes in standards identified as ARARs in the ROD that provide a basis for cleanup levels/protectiveness of the remedy (only ARARs related to protectiveness need be reviewed) – pertinent laws and regulations promulgated since the signing of the ROD that are potentially applicable or relevant and appropriate and that potentially bear on the protectiveness of the remedy
State Environmental Laws and Regulations	– statutory and regulatory requirements that may affect the judgement as to whether the remedy protects human health and the environment	– more stringent State environmental laws and regulations have the same standing under the National Contingency Plan (NCP) as Federal laws and regulations, and should be reviewed in the same manner when they may call into question whether the remedy protects human health and the environment (the State typically should perform this component of the review)

Implementation of the Response

Implementation documents furnish information about design assumptions, design plans or modifications, and documentation of the completion of construction at operable units (OUs) and the site. Design reports, plans, and specifications are other documents that provide further information.

Document	Purpose of Document	Use During the Five-Year Review
Remedial Action Reports (and Interim Remedial Action Reports)	<ul style="list-style-type: none"> - documents that for a single operable unit all construction activities are complete, the remedy is operational and functional, and that cleanup levels have been achieved - Interim Remedial Action Reports are used for long-term actions where cleanup levels have not yet been achieved 	<ul style="list-style-type: none"> - detailed history and status of remedial actions
Remedial Drawings (as-built drawings)	<ul style="list-style-type: none"> - documents changes/modifications to the original design which occurred during the construction 	<ul style="list-style-type: none"> - documentation of completed action and/or implemented remedy
Close Out Reports (Preliminary and Final)	<ul style="list-style-type: none"> - documents that all physical construction for all operable units at a site is complete 	<ul style="list-style-type: none"> - background information and the status of the remedial actions at the site
Health and Safety Plan, Contingency Plan/Emergency Response Plan	<ul style="list-style-type: none"> - establishes policies and procedures for protecting the health and safety of personnel during operations - establishes procedures to minimize risks associated with potential site emergencies 	<ul style="list-style-type: none"> - confirmation that in place and properly implemented - site access restrictions and protective clothing requirements for site inspection

Operation and Maintenance

O&M documents describe the ongoing requirements for the implementation of the remedy. (Long-term response actions to restore groundwater and surface water during the remedial phase are referred to as “system operations” in this guidance. Although this section refers to O&M documents, similar documents should be reviewed to assess system operations.) They provide the structure for O&M at the site and confirm that O&M is proceeding as planned. Other O&M documents that may be helpful are the O&M plan, the O&M contract, O&M and Occupational Safety and Health Administration (OSHA) Training Records, permits and service agreements, and access and security logs. Other types of O&M data to be reviewed include permit compliance data such as air or water discharge sampling results, facilities operation data such as treatment train operational records, gas monitoring and leachate collection data,

maintenance records and logs, and O&M cost data. These data demonstrate the proper O&M of the remedy.

Document	Purpose of Document	Use During the Five-Year Review
O&M Manual	<ul style="list-style-type: none"> - contains technical information necessary to operate and maintain the remedy 	<ul style="list-style-type: none"> - purpose and function of the equipment and systems which comprise the overall facility
O&M Reports	<ul style="list-style-type: none"> - documents O&M activities, data, and costs 	<ul style="list-style-type: none"> - to check whether O&M is proceeding as planned
Discharge Permits and Deviations*	<ul style="list-style-type: none"> - notes contaminant levels for the discharge permits - notes contaminant levels for deviations 	<ul style="list-style-type: none"> - to check whether the remedy is operating within design parameters
Monitoring Information/Records (information could include air sampling, groundwater monitoring, survey/settlement monument records, and gas generation records)	<ul style="list-style-type: none"> - records monitoring data and other information, including contaminant levels 	<ul style="list-style-type: none"> - to check whether contaminant levels are within established criteria

* Permits are not required for actions taken onsite. Reviewer should focus on ensuring compliance with substantive requirements of otherwise permitted activities.

Legal Documentation

Legal documentation pertinent to the site may specify responsibilities for conducting remedial actions, implementing institutional and access controls, and performing elements of the five-year reviews.

Document	Purpose of Document	Use During the Five-Year Review
Enforcement Documents <ul style="list-style-type: none"> - Consent Decrees - Unilateral Administrative Orders - Administrative Orders on Consent 	<ul style="list-style-type: none"> - commitments/agreements regarding implementation and operation of the remedy, and conduct of studies 	<ul style="list-style-type: none"> - responsibilities of the PRP for conducting remedial activities at various stages of site cleanup - O&M requirements (when these documents are used to enforce the performance of O&M, they may incorporate O&M documents, such as the O&M Manual)

Document	Purpose of Document	Use During the Five-Year Review
Institutional Controls (deed notices, easements, other conditions, covenants or restrictions on deeds, and groundwater and land use restriction documents)	<ul style="list-style-type: none"> - means to restrict the use of a parcel or an associated resource, such as groundwater 	<ul style="list-style-type: none"> - status of institutional controls
Superfund State Contracts and Cooperative Agreements	<ul style="list-style-type: none"> - State assurances to conduct O&M - State authorities responsible for O&M - specific O&M requirements - agreements with Indian Tribes 	<ul style="list-style-type: none"> - O&M implementation and reporting requirements - roles of different agencies
Interagency Agreements and Federal Facility Agreements	<ul style="list-style-type: none"> - responsibilities of other agencies 	<ul style="list-style-type: none"> - O&M guidelines and rules in effect (sometimes other agencies adopt their own guidelines and rules, which must be consistent with those established by EPA)

Community Involvement

The Community Involvement Plan (CIP) can give you a better understanding of the history of community involvement at the site, and, therefore, a better understanding of activities at the site. In addition, the CIP may help you identify community members who would be valuable resources during the interview process.

Document	Purpose of Document	Use During the Five-Year Review
Community Involvement Plan	<ul style="list-style-type: none"> - site communication strategy that specifies outreach activities 	<ul style="list-style-type: none"> - community concerns/issues and identification of appropriate community members for interviews

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Appendix D
Five-Year Review Interviews

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Five-Year Review Interviews

Information gathered from interviews during the site inspection can be key to understanding site status. Interviews should be conducted with various individuals or groups, including the operation and maintenance (O&M) site manager, O&M staff, local regulatory authorities and response agencies, community action groups or associations, site neighbors, and other stakeholders.

When conducting an interview, the interviewer should note the date of the interview; the name, title, and affiliation of the person interviewed; and the phone number. The interviewer should also indicate whether the interview was conducted at the site, the office, or by phone. Written documentation of the interview should briefly summarize the discussion, address any problems or successes with the implementation of the remedy, and provide suggestions for future reference. Forms to use during interviews are provided at the end of this appendix.

The following tables provide lists of potential individuals to interview and the type of information which may be obtained through the interviews. The potential individuals to be interviewed are categorized by their ability to provide the following types of information:

- Background information
- State and local considerations
- Construction consideration
- Operational problems

All of these individuals can be contacted during the five-year review. In most cases interviewing only a few key individuals will provide sufficient information for the review.

Background Information

The individuals listed below may provide information concerning previous and current concerns about the site, influences that affected the remedy decision, a historical perspective on the site, and further clarification on decisions made during remedy selection.

Interview	Information Sought
Previous EPA Staff/Management	– staff members may offer insight and clarification on decisions made during remedy selection and implementation

Interview	Information Sought
Nearest Neighbors	<ul style="list-style-type: none"> - neighbors may provide insight into the enforcement of institutional controls, changes in land use, trespassing, and unusual or unexpected activity at the site
Community Representatives*	<ul style="list-style-type: none"> - members of the community may provide a broader view of site activities and issues than can be obtained during the site inspection

* Several types of individuals may be interviewed: residents/businesses adjacent to or on the site; residents/businesses within the path of migration; local civic leaders, local officials, Community Advisory Group (CAG), Technical Assistance Grant (TAG) group, and local environmental groups; and other audiences listed in the community profile in the Community Involvement Plan.

Some example interview questions are given below.

1. What is your impression of the project? (general sentiment)
2. What effect have site operations had on the surrounding community?
3. Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details.
4. Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.
5. Do you feel well informed about the site’s activities and progress?
6. Do you have any comments, suggestions, or recommendations regarding the site’s management or operation?

State and Local Considerations

State contacts and local authorities may provide you with information about changes in State laws and regulations and present and prospective land uses and restrictions.

Interview	Information Sought
State Contacts (including those responsible for State water quality, hazardous waste, and environmental health issues)	<ul style="list-style-type: none"> - changes in State laws and regulations that may impact protectiveness - whether the site has been in compliance with permitting or reporting requirements - information on site activities, status, and issues

Interview	Information Sought
Local Authorities (such as police, emergency response or fire departments, and local environmental or planning offices)	<ul style="list-style-type: none"> - status of institutional controls, site access controls, new ordinances in place, changes in actual or projected land use, complaints being filed, and unusual activities at the site

Some example interview questions are given below.

1. What is your impression of the project? (general sentiment)
2. Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give purpose and results.
3. Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events and results of the responses.
4. Do you feel well informed about the site’s activities and progress?
5. Do you have any comments, suggestions, or recommendations regarding the site’s management or operation?

Construction Considerations

It is important for you to determine the status of construction at the site and to ensure that health and safety concerns are addressed.

Interview	Information Sought
Construction Contractor	<ul style="list-style-type: none"> - progress of project and changes in design due to field conditions - revisions to the O&M Manual, implementation of the Health and Safety Plan/Contingency Plan - insight into potential O&M problems
Construction Manager	<ul style="list-style-type: none"> - overview of all contractor construction activities at the site, health and safety issues, site protectiveness during construction, and the quality of the construction
Local Emergency Response Officials	<ul style="list-style-type: none"> - adequacy of contractor’s Health and Safety Plan and the contractor’s implementation of the Plan - adequacy of contractor’s emergency response duties as outlined in the Contingency Plan or Emergency Response Plan of the Health and Safety Plan

Some example interview questions for remedial actions still under construction are given below.

1. What is your impression of the project? (general sentiment)
2. What is the current status of construction (e.g., budget and schedule)?
3. Have any problems been encountered which required, or will require, changes in this remedial design or this ROD?
4. Have any problems or difficulties been encountered which have impacted construction progress or implementability?
5. Do you have any comments, suggestions, or recommendations regarding the project (i.e., design, construction documents, constructability, management, regulatory agencies, etc.)?

Operational Problems

The following individuals may provide information to you regarding the status of O&M at the site so that the team can assess the progress of the O&M implementation, its effectiveness, and any operational problems.

Interview	Information Sought
O&M Manager	<ul style="list-style-type: none"> - O&M status of the remedy, compliance with permit and reporting requirements, and complaints filed - effectiveness of the O&M Plan - information about any potential causes for concern about the remedy
O&M Staff	<ul style="list-style-type: none"> - effectiveness of the O&M Manual - information about any potential causes for concern about the remedy
Remedial Design/Remedial Action Consultant	<ul style="list-style-type: none"> - original concepts behind the O&M of the remedy - questions about remedial design parameters, expected performance and cost, and changes that have occurred during implementation

Some example interview questions are given below.

1. What is your impression of the project? (general sentiment)
2. Is there a continuous onsite O&M presence? If so, please describe staff and activities. If there is not a continuous onsite presence, describe staff and frequency of site inspections and activities.
3. Have there been any significant changes in the O&M requirements, maintenance schedules, or sampling routines since start-up or in the last five years? If so, do they affect the protectiveness or effectiveness of the remedy? Please describe changes and impacts.
4. Have there been unexpected O&M difficulties or costs at the site since start-up or in the last five years? If so, please give details.
5. Have there been opportunities to optimize the operation, maintenance, or sampling efforts? Please describe changes and resultant or desired cost savings or improved efficiency.
6. Do you have any comments, suggestions, or recommendations regarding the project?

INTERVIEW DOCUMENTATION FORM

The following is a list of individual interviewed for this five-year review. See the attached contact record(s) for a detailed summary of the interviews.

_____	_____	_____	_____
Name	Title/Position	Organization	Date

_____	_____	_____	_____
Name	Title/Position	Organization	Date

_____	_____	_____	_____
Name	Title/Position	Organization	Date

_____	_____	_____	_____
Name	Title/Position	Organization	Date

_____	_____	_____	_____
Name	Title/Position	Organization	Date

_____	_____	_____	_____
Name	Title/Position	Organization	Date

INTERVIEW RECORD			
Site Name:		EPA ID No.:	
Subject:		Time:	Date:
Type: <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
Location of Visit:			
Contact Made By:			
Name:		Title:	Organization:
Individual Contacted:			
Name:		Title:	Organization:
Telephone No.:		Street Address:	
Fax No.:		City, State, Zip:	
E-Mail Address:			
Summary Of Conversation			

INTERVIEW RECORD		
Site Name:	EPA ID No.:	
Subject:	Time:	Date:
Summary Of Conversation (Cont.)		

Appendix E
Five-Year Review Site Inspection Checklist

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Five-Year Review Site Inspection Checklist

Purpose of the Checklist

The site inspection checklist provides a consistent method for collecting essential information during the site inspection portion of the five-year review. The checklist serves as a reminder of what information needs to be gathered and provides the means of checking off information obtained and reviewed, or information not available or applicable. The checklist is divided into sections as follows:

- I. Site Information
- II. Interviews
- III. Onsite Documents & Records Verified
- IV. O&M Costs
- V. Access and Institutional Controls
- VI. General Site Conditions
- VII. Landfill Covers
- VIII. Vertical Barrier Walls
- IX. Groundwater/Surface Water Remedies
- X. Other Remedies
- XI. Overall Observations

Some data and information called for in the checklist may or may not be at the site depending on how the site is managed. Sampling results, costs, and maintenance reports may be kept onsite or may be kept in the offices of the contractor or at State offices. In cases where the information does not reside at the site, the item should not be checked as “not applicable,” but rather it should be obtained from the office or agency where it resides. If this is known in advance, it may be possible to obtain the information before the site inspection.

This checklist was developed by EPA in conjunction with the U.S. Army Corps of Engineers (USACE). It focuses on the two most common types of remedies that are subject to five-year reviews: landfill covers, and groundwater pump and treatment remedies. Sections are also provided for surface water collection and monitored natural attenuation. The sections on general site conditions would be applicable to a wider variety of remedies. The checklist should be modified when inspecting other types of remedies.

The checklist may be completed by hand and attached to the five-year review report to document site status. Please note that the checklist is not meant to be completely definitive or restrictive; additional information may be supplemented if the reviewer deems necessary. Also note that actual site conditions should be documented with photographs whenever possible.

Using the Checklist for Types of Remedies

The checklist has sections designed to capture information concerning the main types of remedies which are found at sites requiring five-year reviews. These remedies are landfill covers (Section VII of the checklist) and groundwater and surface water remedies (Section IX). The primary elements and appurtenances for these remedies are listed in sections which can be checked off as the facility is inspected. The opportunity is also provided to note conditions, write comments on the facilities, and attach additional information. If a site includes remedies beyond these, such as soil vapor extraction or soil landfarming, the information should be gathered in a similar manner and attached to the checklist.

Considering Operation and Maintenance Costs

Unexpectedly widely varying or unexpectedly high O&M costs can be early indicators of remedy failure. For this reason, it is important to obtain a record of the original O&M cost estimate and of annual O&M costs during the years for which costs are available. Section IV of the checklist provides a place for documenting annual costs and for commenting on unanticipated or unusually high O&M costs. A more detailed categorization of costs may be attached to the checklist if available. Examples of categories of O&M costs are listed below.

Operating Labor - This includes all wages, salaries, training, overhead, and fringe benefits associated with the labor needed for operation of the facilities and equipment associated with the remedial actions.

Maintenance Equipment and Materials - This includes the costs for equipment, parts, and other materials required to perform routine maintenance of facilities and equipment associated with a remedial action.

Maintenance Labor - This includes the costs for labor required to perform routine maintenance of facilities and for equipment associated with a remedial action.

Auxiliary Materials and Energy - This includes items such as chemicals and electricity needed for plant operation, water and sewer service, and fuel costs.

Purchased Services - This includes items such as sampling costs, laboratory fees, and other professional services for which the need can be predicted.

Administrative Costs - This includes all costs associated with administration of O&M not included under other categories, such as labor overhead.

Insurance, Taxes and Licenses - This includes items such as liability and sudden and accidental insurance, real estate taxes on purchased land or right-of-way, licensing fees for certain technologies, and permit renewal and reporting costs.

Other Costs - This includes all other items which do not fit into any of the above categories.

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Please note that “O&M” is referred to throughout this checklist. At sites where Long-Term Response Actions are in progress, O&M activities may be referred to as “system operations” since these sites are not considered to be in the O&M phase while being remediated under the Superfund program.

Five-Year Review Site Inspection Checklist (Template)

(Working document for site inspection. Information may be completed by hand and attached to the five-year review report as supporting documentation of site status. “N/A” refers to “not applicable.”)

I. SITE INFORMATION	
Site name:	Date of inspection:
Location and Region:	EPA ID:
Agency, office, or company leading the five-year review:	Weather/temperature:
Remedy Includes: (Check all that apply) <input type="checkbox"/> Landfill cover/containment <input type="checkbox"/> Access controls <input type="checkbox"/> Institutional controls <input type="checkbox"/> Groundwater pump and treatment <input type="checkbox"/> Surface water collection and treatment <input type="checkbox"/> Other _____ _____	
Attachments: <input type="checkbox"/> Inspection team roster attached <input type="checkbox"/> Site map attached	
II. INTERVIEWS (Check all that apply)	
1. O&M site manager _____ _____ _____ <div style="display: flex; justify-content: space-between; margin-left: 100px;"> Name Title Date </div> Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone Phone no. _____ Problems, suggestions; <input type="checkbox"/> Report attached _____ _____	
2. O&M staff _____ _____ _____ <div style="display: flex; justify-content: space-between; margin-left: 100px;"> Name Title Date </div> Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone Phone no. _____ Problems, suggestions; <input type="checkbox"/> Report attached _____ _____	

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency _____
Contact _____
Name Title Date Phone no.
Problems; suggestions; **G** Report attached _____

Agency _____
Contact _____
Name Title Date Phone no.
Problems; suggestions; **G** Report attached _____

Agency _____
Contact _____
Name Title Date Phone no.
Problems; suggestions; **G** Report attached _____

Agency _____
Contact _____
Name Title Date Phone no.
Problems; suggestions; **G** Report attached _____

4. **Other interviews** (optional) **G** Report attached.

III. ONSITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)			
1.	O&M Documents G O&M manual G As-built drawings G Maintenance logs Remarks _____	G Readily available G Readily available G Readily available	G Up to date G Up to date G Up to date G N/A G N/A G N/A
2.	Site-Specific Health and Safety Plan G Contingency plan/emergency response plan Remarks _____	G Readily available G Readily available	G Up to date G Up to date G N/A G N/A
3.	O&M and OSHA Training Records Remarks _____	G Readily available	G Up to date G N/A
4.	Permits and Service Agreements G Air discharge permit G Effluent discharge G Waste disposal, POTW G Other permits _____ Remarks _____	G Readily available G Readily available G Readily available G Readily available	G Up to date G Up to date G Up to date G Up to date G N/A G N/A G N/A G N/A
5.	Gas Generation Records Remarks _____	G Readily available	G Up to date G N/A
6.	Settlement Monument Records Remarks _____	G Readily available	G Up to date G N/A
7.	Groundwater Monitoring Records Remarks _____	G Readily available	G Up to date G N/A
8.	Leachate Extraction Records Remarks _____	G Readily available	G Up to date G N/A
9.	Discharge Compliance Records G Air G Water (effluent) Remarks _____	G Readily available G Readily available	G Up to date G Up to date G N/A G N/A
10.	Daily Access/Security Logs Remarks _____	G Readily available	G Up to date G N/A

IV. O&M COSTS																																											
1.	O&M Organization	<input type="checkbox"/> State in-house <input type="checkbox"/> Contractor for State <input type="checkbox"/> PRP in-house <input type="checkbox"/> Contractor for PRP <input type="checkbox"/> Other _____ _____																																									
2.	O&M Cost Records	<input type="checkbox"/> Readily available <input type="checkbox"/> Up to date <input type="checkbox"/> Funding mechanism/agreement in place Original O&M cost estimate _____ <input type="checkbox"/> Breakdown attached <div style="text-align: center;">Total annual cost by year for review period if available</div> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">From _____</td> <td style="width: 10%;">To _____</td> <td style="width: 20%;">_____</td> <td style="width: 50%;"><input type="checkbox"/> Breakdown attached</td> </tr> <tr> <td style="text-align: center;">Date</td> <td style="text-align: center;">Date</td> <td style="text-align: center;">Total cost</td> <td></td> </tr> <tr> <td>From _____</td> <td>To _____</td> <td>_____</td> <td><input type="checkbox"/> Breakdown attached</td> </tr> <tr> <td style="text-align: center;">Date</td> <td style="text-align: center;">Date</td> <td style="text-align: center;">Total cost</td> <td></td> </tr> <tr> <td>From _____</td> <td>To _____</td> <td>_____</td> <td><input type="checkbox"/> Breakdown attached</td> </tr> <tr> <td style="text-align: center;">Date</td> <td style="text-align: center;">Date</td> <td style="text-align: center;">Total cost</td> <td></td> </tr> <tr> <td>From _____</td> <td>To _____</td> <td>_____</td> <td><input type="checkbox"/> Breakdown attached</td> </tr> <tr> <td style="text-align: center;">Date</td> <td style="text-align: center;">Date</td> <td style="text-align: center;">Total cost</td> <td></td> </tr> <tr> <td>From _____</td> <td>To _____</td> <td>_____</td> <td><input type="checkbox"/> Breakdown attached</td> </tr> <tr> <td style="text-align: center;">Date</td> <td style="text-align: center;">Date</td> <td style="text-align: center;">Total cost</td> <td></td> </tr> </table>	From _____	To _____	_____	<input type="checkbox"/> Breakdown attached	Date	Date	Total cost		From _____	To _____	_____	<input type="checkbox"/> Breakdown attached	Date	Date	Total cost		From _____	To _____	_____	<input type="checkbox"/> Breakdown attached	Date	Date	Total cost		From _____	To _____	_____	<input type="checkbox"/> Breakdown attached	Date	Date	Total cost		From _____	To _____	_____	<input type="checkbox"/> Breakdown attached	Date	Date	Total cost		
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Date	Date	Total cost																																									
3.	Unanticipated or Unusually High O&M Costs During Review Period Describe costs and reasons: _____ _____ _____ _____ _____ _____																																										
V. ACCESS AND INSTITUTIONAL CONTROLS <input type="checkbox"/> Applicable <input type="checkbox"/> N/A																																											
A. Fencing																																											
1.	Fencing damaged	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Gates secured <input type="checkbox"/> N/A																																								
	Remarks _____ _____																																										

B. Other Access Restrictions				
1.	Signs and other security measures	G Location shown on site map	G N/A	
Remarks _____ _____				
C. Institutional Controls				
1.	Implementation and enforcement			
Site conditions imply ICs not properly implemented		G Yes	G No	G N/A
Site conditions imply ICs not being fully enforced		G Yes	G No	G N/A
Type of monitoring (e.g., self-reporting, drive by) _____				
Frequency _____				
Responsible party/agency _____				
Contact _____				
		Name	Title	Date
		Phone no.		
Reporting is up-to-date		G Yes	G No	G N/A
Reports are verified by the lead agency		G Yes	G No	G N/A
Specific requirements in deed or decision documents have been met		G Yes	G No	G N/A
Violations have been reported		G Yes	G No	G N/A
Other problems or suggestions: G Report attached		_____		

2.	Adequacy	G ICs are adequate	G ICs are inadequate	G N/A
Remarks _____ _____				

D. General				
1.	Vandalism/trespassing	G Location shown on site map	G No vandalism evident	
Remarks _____ _____				
2.	Land use changes onsite	G N/A		
Remarks _____ _____				
3.	Land use changes offsite	G N/A		
Remarks _____ _____				

VI. GENERAL SITE CONDITIONS				
A. Roads G Applicable G N/A				
1.	Roads damaged Remarks _____ _____	G Location shown on site map	G Roads adequate	G N/A
B. Other Site Conditions				
Remarks _____ _____ _____ _____ _____				
VII. LANDFILL COVERS G Applicable G N/A				
A. Landfill Surface				
1.	Settlement (Low spots) Areal extent _____ Remarks _____ _____	G Location shown on site map Depth _____	G Settlement not evident	
2.	Cracks Lengths _____ Widths _____ Depths _____ Remarks _____ _____	G Location shown on site map	G Cracking not evident	
3.	Erosion Areal extent _____ Remarks _____ _____	G Location shown on site map Depth _____	G Erosion not evident	
4.	Holes Areal extent _____ Remarks _____ _____	G Location shown on site map Depth _____	G Holes not evident	
5.	Vegetative Cover G Grass G Cover properly established G No signs of stress G Trees/Shrubs (indicate size and locations on a diagram) Remarks _____ _____			
6.	Alternative Cover (armored rock, concrete, etc.)		G N/A	
Remarks _____ _____				

7.	Bulges Areal extent _____ Remarks _____ _____	G Location shown on site map Height _____	G Bulges not evident
8.	Wet Areas/Water Damage G Wet areas G Ponding G Seeps G Soft subgrade Remarks _____ _____	G Wet areas/water damage not evident G Location shown on site map G Location shown on site map G Location shown on site map G Location shown on site map	Areal extent _____ Areal extent _____ Areal extent _____ Areal extent _____
9.	Slope Instability Areal extent _____ Remarks _____ _____	G Slides G Location shown on site map	G No evidence of slope instability
B. Benches G Applicable G N/A (Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)			
1.	Flows Bypass Bench Remarks _____ _____	G Location shown on site map	G N/A or okay
2.	Bench Breached Remarks _____ _____	G Location shown on site map	G N/A or okay
3.	Bench Overtopped Remarks _____ _____	G Location shown on site map	G N/A or okay
C. Letdown Channels G Applicable G N/A (Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)			
1.	Settlement Areal extent _____ Depth _____ Remarks _____ _____	G Location shown on site map	G No evidence of settlement
2.	Material Degradation Material type _____ Remarks _____ _____	G Location shown on site map Areal extent _____	G No evidence of degradation

3.	Erosion	G Location shown on site map	G No evidence of erosion
	Areal extent _____	Depth _____	
	Remarks _____ _____		
4.	Undercutting	G Location shown on site map	G No evidence of undercutting
	Areal extent _____	Depth _____	
	Remarks _____ _____		
5.	Obstructions	Type _____	G No obstructions
	G Location shown on site map	Areal extent _____	
	Size _____		
	Remarks _____ _____		
6.	Excessive Vegetative Growth	Type _____	
	G No evidence of excessive growth		
	G Vegetation in channels does not obstruct flow		
	G Location shown on site map	Areal extent _____	
	Remarks _____ _____		
D. Cover Penetrations G Applicable G N/A			
1.	Gas Vents	G Active	G Passive
	G Properly secured/locked	G Functioning	G Routinely sampled
	G Evidence of leakage at penetration	G Needs O&M	G Good condition
			G N/A
	Remarks _____ _____		
2.	Gas Monitoring Probes	G Functioning	G Routinely sampled
	G Properly secured/locked	G Needs O&M	G Good condition
	G Evidence of leakage at penetration		G N/A
	Remarks _____ _____		
3.	Monitoring Wells (within surface area of landfill)	G Functioning	G Routinely sampled
	G Properly secured/locked	G Needs O&M	G Good condition
	G Evidence of leakage at penetration		G N/A
	Remarks _____ _____		
4.	Leachate Extraction Wells	G Functioning	G Routinely sampled
	G Properly secured/locked	G Needs O&M	G Good condition
	G Evidence of leakage at penetration		G N/A
	Remarks _____ _____		

5.	Settlement Monuments	G Located	G Routinely surveyed	G N/A
Remarks _____				
E. Gas Collection and Treatment				
		G Applicable	G N/A	
1.	Gas Treatment Facilities	G Flaring	G Thermal destruction	G Collection for reuse
		G Good condition	G Needs O&M	
Remarks _____				
2.	Gas Collection Wells, Manifolds and Piping	G Good condition	G Needs O&M	
Remarks _____				
3.	Gas Monitoring Facilities (e.g., gas monitoring of adjacent homes or buildings)	G Good condition	G Needs O&M	G N/A
Remarks _____				
F. Cover Drainage Layer				
		G Applicable	G N/A	
1.	Outlet Pipes Inspected	G Functioning	G N/A	
Remarks _____				
2.	Outlet Rock Inspected	G Functioning	G N/A	
Remarks _____				
G. Detention/Sedimentation Ponds				
		G Applicable	G N/A	
1.	Siltation	Areal extent _____	Depth _____	G N/A
		G Siltation not evident		
Remarks _____				
2.	Erosion	Areal extent _____	Depth _____	
		G Erosion not evident		
Remarks _____				
3.	Outlet Works	G Functioning	G N/A	
Remarks _____				
4.	Dam	G Functioning	G N/A	
Remarks _____				

H. Retaining Walls		G Applicable	G N/A
1.	Deformations Horizontal displacement _____ Vertical displacement _____ Rotational displacement _____ Remarks _____	G Location shown on site map	G Deformation not evident
2.	Degradation Remarks _____	G Location shown on site map	G Degradation not evident
I. Perimeter Ditches/Off-Site Discharge		G Applicable	G N/A
1.	Siltation Areal extent _____ Depth _____ Remarks _____	G Location shown on site map	G Siltation not evident
2.	Vegetative Growth G Vegetation does not impede flow Areal extent _____ Type _____ Remarks _____	G Location shown on site map	G N/A
3.	Erosion Areal extent _____ Depth _____ Remarks _____	G Location shown on site map	G Erosion not evident
4.	Discharge Structure Remarks _____	G Functioning	G N/A
VIII. VERTICAL BARRIER WALLS		G Applicable	G N/A
1.	Settlement Areal extent _____ Depth _____ Remarks _____	G Location shown on site map	G Settlement not evident
2.	Performance Monitoring G Performance not monitored Frequency _____ Head differential _____ Remarks _____	Type of monitoring _____	G Evidence of breaching

IX. GROUNDWATER/SURFACE WATER REMEDIES		G Applicable	G N/A
A. Groundwater Extraction Wells, Pumps, and Pipelines		G Applicable	G N/A
1.	Pumps, Wellhead Plumbing, and Electrical G Good condition G All required wells located G Needs O&M G N/A Remarks _____ _____ _____		
2.	Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances G Good condition G Needs O&M Remarks _____ _____		
3.	Spare Parts and Equipment G Readily available G Good condition G Requires upgrade G Needs to be provided Remarks _____ _____		
B. Surface Water Collection Structures, Pumps, and Pipelines		G Applicable	G N/A
1.	Collection Structures, Pumps, and Electrical G Good condition G Needs O&M Remarks _____ _____		
2.	Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances G Good condition G Needs O&M Remarks _____ _____		

3.	Spare Parts and Equipment <input type="checkbox"/> Readily available <input type="checkbox"/> Good condition <input type="checkbox"/> Requires upgrade <input type="checkbox"/> Needs to be provided Remarks _____ _____
C. Treatment System <input type="checkbox"/> Applicable <input type="checkbox"/> N/A	
1.	Treatment Train (Check components that apply) <input type="checkbox"/> Metals removal <input type="checkbox"/> Oil/water separation <input type="checkbox"/> Bioremediation <input type="checkbox"/> Air stripping <input type="checkbox"/> Carbon adsorbers <input type="checkbox"/> Filters _____ <input type="checkbox"/> Additive (e.g., chelation agent, flocculent) _____ <input type="checkbox"/> Others _____ <input type="checkbox"/> Good condition <input type="checkbox"/> Needs O&M <input type="checkbox"/> Sampling ports properly marked and functional <input type="checkbox"/> Sampling/maintenance log displayed and up to date <input type="checkbox"/> Equipment properly identified <input type="checkbox"/> Quantity of groundwater treated annually _____ <input type="checkbox"/> Quantity of surface water treated annually _____ Remarks _____ _____
2.	Electrical Enclosures and Panels (properly rated and functional) <input type="checkbox"/> N/A <input type="checkbox"/> Good condition <input type="checkbox"/> Needs O&M Remarks _____ _____
3.	Tanks, Vaults, Storage Vessels <input type="checkbox"/> N/A <input type="checkbox"/> Good condition <input type="checkbox"/> Proper secondary containment <input type="checkbox"/> Needs O&M Remarks _____ _____
4.	Discharge Structure and Appurtenances <input type="checkbox"/> N/A <input type="checkbox"/> Good condition <input type="checkbox"/> Needs O&M Remarks _____ _____
5.	Treatment Building(s) <input type="checkbox"/> N/A <input type="checkbox"/> Good condition (esp. roof and doorways) <input type="checkbox"/> Needs repair <input type="checkbox"/> Chemicals and equipment properly stored Remarks _____ _____
6.	Monitoring Wells (pump and treatment remedy) <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> All required wells located <input type="checkbox"/> Needs O&M <input type="checkbox"/> N/A Remarks _____ _____

D. Monitored Natural Attenuation			
1.	Monitoring Wells (natural attenuation remedy)		
	G Properly secured/locked	G Functioning	G Routinely sampled
	G All required wells located	G Needs O&M	G N/A
	Remarks _____		

X. OTHER REMEDIES			
If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.			
XI. OVERALL OBSERVATIONS			
A. Implementation of the Remedy			
Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).			

B. Adequacy of O&M			
Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.			

C. Early Indicators of Potential Remedy Failure

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

Appendix F
Community Involvement

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Community Involvement

This appendix contains information about communicating with the public during a five-year review. Activities to be conducted at each site will vary based on site-specific community interest. This appendix discusses the following topics:

- The role of the Community Involvement Coordinator (CIC)
- The minimum community involvement activities needed during the five-year review process
- Recommended community involvement activities at high visibility sites
- A time line for planning communication activities

Role of the Community Involvement Coordinator (CIC)

The CIC serves as a public participation and communications advisor. It is his/her job to ensure that effective and informative communication with the community occurs. You should consult the CIC about the most appropriate methods for notifying and involving the community. The CIC can advise on, develop, and implement activities designed to ensure that the community is sufficiently informed to understand and accept review results. From past experience and reviewing the Community Involvement Plan (CIP),¹ CICs can determine whether the community has been contentious, interested, apathetic, etc. The CIC can also advise you on how best to communicate with the community. For example, if the CIP indicates that some of the surrounding residents speak Spanish as their first language and are not proficient in English, the CIC can arrange for an interpreter. Keep in mind, however, that much could have changed since the CIP was last revised or since the last five-year review; there may even be an entirely new set of businesses or residents in the area.

Community Involvement Activities

At a minimum, community involvement activities during the five-year review include

- Notifying the community that the five-year review will be conducted;
- Notifying the community that the five-year review has been completed;
- Preparing and distributing a brief summary of the results of the review;

- Placing a copy of the five-year report in the site information repositories;
- Informing the community of the availability of the five-year review report.

You should notify the community that a five-year review will be conducted. Your notification should state

- That a review will be conducted;
- The type of review (statutory or policy);
- How the community can contribute;
- The location of the five-year review report when completed.

Your CIC can recommend appropriate communication vehicles for notifying the public (e.g., publishing a public notice in the newspaper).

When the five-year review report is complete, you should notify the community of the results in a brief summary and place the five-year review report in the site information repositories. The brief summary of the results should include

- A brief summary of the remedy;
- The protectiveness statements;
- The information used to make protectiveness determinations, written in language the public can understand;
- Any deficiencies, recommendations, and follow-up actions directly related to the protectiveness of the remedy;
- The location of the five-year review report;
- Contact name(s) or number(s) where community members can obtain more information or ask questions about the results;
- The date of the next five-year review (or a statement that five-year reviews will no longer be necessary).

Additional Recommended Activities at High Visibility Sites

At high profile sites or those with significant public interest, you should carefully consider the means of informing the community about the review and whether to conduct additional community involvement activities. During the five-year review, active community members are likely to be interested in some or all of the following topics:

- The five-year review process
- How they can contribute information about site activities
- Where to find written documentation about the review
- What the protectiveness statements mean
- What happens after the review is complete, especially if the remedy is found to be not protective

The CIC and others on the review team that have knowledge of the community's needs and interests should be involved in decisions on the level of community involvement and appropriate activities.

If the community is especially interested in site activities, you should consider developing a communication strategy. The communication strategy should

- Describe the public's concerns and communication needs;
- Identify specific communication activities that you plan to conduct;
- Outline a proposed schedule for these activities;
- Present expected results.

Consult Section V of the *Superfund Community Involvement Handbook and Toolkit*² for an example of a communication strategy. This strategy does not need to be added to the official record, and can be as informal or detailed as community needs demand.

There are several means of notifying the community that you may want to consider at a high visibility site. From past experiences, the CIC or another member of the review team may know that community members have been particularly interested in site activities, and need extra help understanding these activities. You should determine the best means for notifying the community that the five-year review is beginning, such as holding an open house that allows

community members to stop in and ask questions or obtain documentation (e.g., fact sheets, brochures, etc.) about the site and the five-year review. When notifying the community, you should consider providing further information about the five-year review process and the activities planned for the review.

Recommended ways to notify the community include

- Broadcasting a public service announcement on radio or television;
- Holding an open house;
- Mailing, posting, or handing out a fact sheet.

Depending on the nature of the site and the interest in the community, another option for involving the public is to provide a public comment period on the results. Remember, this may be the last formal contact community members have with EPA about the site until the next five-year review.

In addition to notifying the community about the review, you should consider consulting with the community to gather information about site activities. Through interviews, community members can provide information about site conditions, successes and problems at the site, and other community concerns. For instance, you may want to interview members of a Community Advisory Group in addition to interviewing site neighbors.

You should review the community profile in the CIP to obtain useful information about the community, such as business owners or residents living near the site, and the past level of interest from individuals and groups in the community. The CIP can also be a source for identifying stakeholders that previously have been active with site activities and that could provide information about site conditions.

Community Advisory Groups and Technical Assistance Grant groups represent the general viewpoint of the interests or concerns of the community. You might want to hold an informal meeting to gain perspective from these groups. Another potential source of information are local officials. In many cases, the CIC may be the best person to consult with local officials, as they may have met or spoken with them previously and established a comfortable rapport.

See Appendix D, “Five-Year Review Interviews,” for more information about conducting interviews as part of a five-year review.

Time Line of Communication Activities During the Five-Year Review

The following table outlines the major communication milestones during a five-year review and a suggested time frame for conducting communication activities, especially at high profile sites or those with a strong public interest. Consult the *Superfund Community Involvement Handbook and Toolkit* to determine which activities are best suited for your community at each stage, and for details on the time frame and effort needed for each activity. Activities may be conducted before or at the outset of the five-year review and during or close to the time of the site inspection, depending on the community needs. Activities that should be conducted for all five-year reviews are identified with an arrow.

Activities Needed for All Reviews	Major Milestones in the Five-Year Review Process	Suggested Time Frame for Communication Activities
Planning the Review and Notifying the Community		
➡	<ol style="list-style-type: none"> 1. The CIC reviews the existing CIP for potentially helpful information. The CIC should lead this effort. 2. When needed, you should develop a communication strategy. 3. You notify the community that the five-year review will begin, using a communication activity appropriate to the specific community. 	<p>Begin planning immediately, so that if interaction with the community is needed, it is provided for up-front.</p> <p>Prepare a communication strategy before notifying the community. Circumstances and the level of public interest may change throughout the process, so refer to and update the strategy regularly.</p> <p>Notify the community that the five-year review process is beginning before the site inspection.</p>
Consulting the Community		
	<ol style="list-style-type: none"> 4. You may interview community members to gather additional information about the site. 	<p>Depending on whether contact with the community is via telephone, in person, etc., plan for about one month of coordination and gathering of information.</p>
Communicating the Results of the Five-Year Review		
➡	<ol style="list-style-type: none"> 5. You should notify the community that the five-year review report is complete, prepare and distribute a brief summary of the results, and place the report in the site information repositories. 6. You can plan and conduct additional communication activities to ensure the community understands and accepts review results. 	<p>This information should be provided as quickly as possible after the five-year review report is completed. Consult with the CIC before preparing the summary to determine which communication mechanism is most appropriate to the community's needs.</p> <p>No matter the activity, ensure that it is planned before releasing results to the public. Try to complete these activities within six months after the five-year review report is complete.</p>

More Information on Community Involvement

For more information on community involvement activities, consult the following sources:

- ***The Superfund Community Involvement Handbook and Toolkit.*** (This document is still in development by EPA's Office of Emergency and Remedial Response, Community Involvement and Outreach Center.) This two-volume handbook and toolkit includes guidance on community involvement policy throughout the Superfund pipeline, including special chapters on working at Federal facilities, risk communication, and multimedia sites. The toolkit components describe and provide over 100 tools the CICs can use to make their job easier, such as electronic and hard copy templates for public notices, press releases, fact sheets, communication strategies, etc.
- ***The Superfund Community Tools Home Page.*** There are a number of information resources available on the EPA Internet. Point your Web browser to <http://www.epa.gov/superfund/tools/index.htm> to access the Superfund Community Tools Home Page.

Notes:

1. The CIP typically describes the history of the site, including any community involvement activities conducted in the past or special needs of the community.
2. The Community Involvement Handbook and Toolkit is still in draft form; all information pertaining to this document will be updated prior to the publication of this guidance.

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Appendix G
History of the Policy for When Five-Year Reviews Were Required

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History of the Policy for When Five-Year Reviews Were Required

You should complete a five-year review and obtain appropriate signatures on the five-year review report within five years of the date of the action recorded in WasteLAN that “triggers” a five-year review. WasteLAN (also sometimes referred to as CERCLIS) is an integrated information system designed to store comprehensive and reliable data across the Superfund program.

One key difference between reviews required by statute and those conducted as a matter of policy is when these reviews first begin. As described in Chapter 1, the first statutory review at a site should be conducted within five years of the initiation of a remedial action. The first policy review at a site, however, does not need to be completed until five years after the site is designated construction complete. Regions may choose to conduct a five-year review earlier, or more frequently than every five years if needed to ensure the protection of human health and the environment. In the past there were different actions that triggered statutory and policy reviews. This appendix provides historical information regarding past policies for when five-year reviews were due.

The first few five-year reviews were due in 1991. Reviews for most sites were not due until later years. Originally, both statutory and policy reviews were due five years from the initiation of remedial action, which was determined by the “actual remedial action (RA) contract award date.” To allow time to implement policy reviews, the Office of Emergency and Remedial Response issued a February 12, 1992, memorandum to the Regions establishing that policy five-year reviews for sites where the remedial action had been initiated before May 1, 1987, should be completed no later than December 31, 1992.

Because the five-year review provision was added as part of the Superfund Amendments and Reauthorization Act of 1986, the first statutory reviews were not due until 1991. Please see Chapter 1, Section 1.4 for a more complete explanation of when you need to complete a five-year review. EPA established the concept of conducting reviews as a matter of policy in the May 23, 1991, OSWER Directive 9355.7-02 (“Structure and Components of Five-Year Reviews”) that described policy five-year reviews for the first time.

Subsequently, OSWER Directive 9355.7-02A (“Supplemental Five-Year Review Guidance,” July 26, 1994) changed the trigger date for statutory sites from “actual RA contract award” to the date of “actual RA onsite construction.” Where the date of “actual RA onsite construction” was not available, the following hierarchy was used:

- 1) planned RA onsite construction date
- 2) actual RA contract award date
- 3) planned RA contract award date
- 4) actual RA start date
- 5) planned RA start date
- 6) ROD signature date

The July 1994 Directive also changed the trigger date for policy reviews where a review had not been conducted to “completion of physical construction,” five years from the date a site qualifies for listing on the construction completion list. A site qualifies for listing as construction complete at the time of signature of the Preliminary or Final Close Out Report (PCOR or FCOR). Beginning in fiscal year 1998, the “construction completion” date is listed directly in WasteLAN.

This new Comprehensive Five-Year Review guidance simplifies the trigger date for statutory reviews. As a result, effective as of this guidance, the trigger dates for statutory and policy five-year reviews are as follows:

- The trigger for most statutory reviews is the “actual RA onsite construction” date
- The trigger for most policy reviews is the “construction completion” date

The following exhibit summarizes the prior methodologies used for trigger determinations.

Former Hierarchy of Actions Used for Trigger Determinations		
Statutory Sites	First review conducted before 7/26/94	<ol style="list-style-type: none"> 1. Actual RA contract award date 2. Planned RA contract award date 3. Actual RA start date 4. Planned RA start date 5. ROD signature date
	First review conducted 7/26/94 and after	<ol style="list-style-type: none"> 1. Actual RA onsite construction 2. Planned RA onsite construction 3. Actual RA contract award date 4. Planned RA contract award date 5. Actual RA start date 6. Planned RA start date 7. ROD signature date
Policy Sites	First review conducted before 7/26/94	<p><i>All sites with RA initiation April 30, 1987, and earlier:</i></p> <p>To be completed by December 31, 1992</p> <p><i>All sites with RA initiation May 1, 1987, and later:</i></p> <ol style="list-style-type: none"> 1. Actual RA contract award date 2. Planned RA contract award date 3. Actual RA start date 4. Planned RA start date 5. ROD signature date
	First review conducted 7/26/94 and after	Five years from the date a site qualifies for listing on the construction completion list

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Appendix H
Relevant Passages from Legislation, Regulation,
and Executive Orders

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Relevant Passages from Legislation, Regulation, and Executive Orders

The following is a compilation of statutory, regulatory, and delegatory passages from legislation, regulations, and Executive Orders as they pertain to the implementation of five-year reviews. Descriptions of the passages are followed by text boxes containing the exact language of the cited provision.

Statutory Authority

The five-year review provision is included in CERCLA §121(c). In addition, the following citations address provisions in CERCLA regarding EPA's implementation of response actions, EPA's interaction with States and Indian Tribes, and other topics.

CERCLA §104(a) provides the authority for EPA, through delegation from the President, to pursue removal and remedial actions in response to a release or threat of release of a hazardous substance, or release or threat of release of a pollutant or contaminant which may present an imminent and substantial danger to the public health or welfare, or to take any other response measure consistent with the National Contingency Plan (NCP) which EPA deems necessary to protect public health or welfare or the environment. CERCLA §104(b) gives EPA the authority to undertake investigations, monitoring, surveys, testing, and other information gathering as deemed necessary or appropriate to identify the extent or threat of release of hazardous substances, contaminants, or pollutants. EPA may use legal, fiscal, architectural, economic, engineering, or other studies to plan or direct response actions. CERCLA 104(b) also provides that an investigation of damaged natural resources must be coordinated with the Federal and State natural resource trustee. CERCLA §104(c)(3) requires a State to provide assurances that it will provide future maintenance of fund-financed remedial actions. CERCLA §104(c)(4) states that the selection of remedial actions must be performed in accordance with the requirements of CERCLA §121 (Cleanup Standards). CERCLA §104(d)(1) provides EPA with the authority to enter into Cooperative Agreements with States, political subdivisions, and Indian Tribes to carry out response and related enforcement actions. This section also authorizes EPA to reimburse States for the share of response costs in conducting five-year reviews. CERCLA §104(e)(1) and (e)(3) describe the circumstances in which EPA may use its access authority to gain access to a site.

Authority	Citation
CERCLA §104(a)	<p>(a) Removal and other remedial action by President; applicability of national contingency plan; response by potentially responsible parties; public health threats; limitations on response; exception</p> <p>(1) Whenever (A) any hazardous substance is released or there is a substantial threat of such a release into the environment, or (B) there is a release or substantial threat of release into the environment of any pollutant or contaminant which may present an imminent and substantial danger to the public health or welfare, the President is authorized to act, consistent with the National Contingency Plan, to remove or arrange for the removal of, and provide for remedial action relating to such hazardous substance, pollutant or contaminant at any time (including its removal from any contaminated natural resource), or take any other response measure consistent with the national contingency plan which the President deems necessary to protect the public health or welfare or the environment.</p>
CERCLA §104(b)	<p>(b) Investigations, monitoring, coordination, etc., by President</p> <p>(1) Information; studies and investigations</p> <p>Whenever the President is authorized to act pursuant to subsection (a) of this section, or whenever the President has reason to believe that a release has occurred or is about to occur, or that illness, disease, or complaints thereof may be attributable to exposure to a hazardous substance, pollutant, or contaminant and that a release may have occurred or be occurring, he may undertake such investigations, monitoring, surveys, testing, and other information gathering as he may deem necessary or appropriate to identify the existence and extent of the release or threat thereof, the source and nature of the hazardous substances, pollutants or contaminants involved, and the extent of danger to the public health or welfare or to the environment. In addition, the President may undertake such planning, legal, fiscal, economic, engineering, architectural, and other studies or investigations as he may deem necessary or appropriate to plan and direct response actions, to recover the costs thereof, and to enforce the provisions of this chapter.</p> <p>(2) Coordination of investigations</p> <p>The President shall promptly notify the appropriate Federal and State natural resource trustees of potential damages to natural resources resulting from releases under investigation pursuant to this section and shall seek to coordinate the assessments, investigations, and planning under this section with such Federal and State trustees.</p>
CERCLA §104(c)(3)	<p>(3) The President shall not provide any remedial actions pursuant to this section unless the State in which the release occurs first enters into a contact or cooperative agreement with the President providing assurances deemed adequate by the President that (A) the State will assure all future maintenance of the removal and remedial actions provided for the expected life of such actions as determined by the President; (B) The State will assure the availability of a hazardous waste disposal facility acceptable to the President and in compliance with the requirements of subtitle C of the Solid Waste Disposal Act [42 U.S.C. 6921 et seq.] for any necessary offsite storage, destruction, treatment, or secure disposition of the hazardous substances; and (c) the State will pay or assure payment of (i) 10 per centum of the cost of the remedial action, including all future maintenance, or (ii) 50 percent (or such greater amount as the President may determine appropriate, taking into account the degree of responsibility of the State or political subdivision for the release) of any sums expended in response to a release at a facility, that was operated by the State or political subdivision thereof, either directly or through a contractual relationship or otherwise, at the time of any disposal of hazardous substances therein. . . .</p>

Authority	Citation
CERCLA §104(c)(4)	<p>(4) Selection of Remedial Action The President shall select remedial actions to carry out this section in accordance with section 9621 [section 121] of this title (relating to cleanup standards).</p>
CERCLA §104(d)(1)	<p>(d) Contracts or cooperative agreements by President with States or political subdivisions or Indian tribes; State applications, terms and conditions; reimbursements; cost-sharing provisions; enforcement requirements and procedures</p> <p>(1) Cooperative agreements</p> <p>(A) State applications State or political subdivision thereof or Indian tribe may apply to the President to carry out actions authorized in this section. If the President determines that the State or political subdivision or Indian tribe has the capability to carry out any or all of such actions in accordance with the criteria and priorities established pursuant to section 9605(a)(8) of this title and to carry out related enforcement actions, the President may enter into a contract or cooperative agreement with the State or political subdivision or Indian tribe to carry out such actions. The President shall make a determination regarding such an application within 90 days after the President receives the application.</p> <p>(B) Terms and conditions A contract or cooperative agreement under this paragraph shall be subject to such terms and conditions as the President may prescribe. The contract or cooperative agreement may cover a specific facility or specific facilities.</p> <p>(c) Reimbursements Any State which expended funds during the period beginning on the enactment of this subparagraph, for response actions at any site included on the National Priorities List and subject to a cooperative agreement under this chapter shall be reimbursed for the share of costs of such actions for which the Federal Government is responsible under this chapter.</p>
CERCLA §104(e)(1)	<p>(e)(1) Action required Any officer, employee, or representative of the President, duly designated by the President, is authorized to take action under paragraph (2), (3), or (4) (or any combination thereof) at a vessel, facility, establishment, place, property, or location or, in the case of paragraph (3) or (4), at any vessel, facility, establishment, place, property, or location which is adjacent to the vessel, facility, establishment, place, or property location.</p>
CERCLA § 104 (e)(3)	<p>(e)(3) Entry Any officer, employee, or representative described in paragraph (1) is authorized to enter at reasonable times any of the following:</p> <p>(A) Any vessel, facility, establishment, or other place or property where any hazardous substance or pollutant or contaminant may be or has been generated, stored, treated, disposed of, or transported from.</p> <p>(B) Any vessel, facility, establishment, or other place or property where any hazardous substance or pollutant or contaminant has been or may have been released.</p> <p>(C) Any vessel, facility, establishment, or other place or property where such a release is threatened.</p> <p>(D) Any vessel, facility, establishment, or other place or property where entry is needed to determine the need for response or the appropriate response or to effectuate a response action under this subchapter.</p>

Authority	Citation
CERCLA §104(e)(7)(C)	(e) Information gathering and access (7) Confidentiality of information (C) In submitting data under this chapter, a person required to provide such data may (i) designate the data which such a person believes is entitled to protection under this subsection and (ii) submit such designated data separately from other data submitted under this chapter. A designation under this paragraph shall be made in writing and in such a manner as the President may prescribe by regulation.

CERCLA §107(a) allows States to recover the costs of conducting five-year reviews through cost recovery actions, if Cooperative Agreements are not available.

Authority	Citation
CERCLA §107(a)	(a) Covered persons; scope; recoverable costs and damages; interest rate; "comparable maturity" date Notwithstanding any other provision or rule of law, and subject only to the defenses set forth in subsection (b) of this section- (1) the owner and operator of a vessel or a facility, (2) any person who at the time of disposal of any hazardous substance owned or operated any facility at which such hazardous substances were disposed of, (3) any person who by contract, agreement, or otherwise arranged for disposal or treatment, or arranged with a transporter for transport for disposal or treatment, of hazardous substances owned or possessed by such person, by any other party or entity, at any facility or incineration vessel owned or operated by another party or entity and containing such hazardous substances, and (4) any person who accepts or accepted any hazardous substances for transport to disposal or treatment facilities, incineration vessels or sites selected by such person, from which there is a release, or a threatened release which causes the incurrence of response costs, of a hazardous substance, shall be liable for... (A) all costs of removal or remedial action incurred by the United States Government or State or an Indian Tribe not inconsistent with the National Contingency Plan. . . The amounts recoverable in an action under this section shall include interest on the amounts recoverable under subparagraphs (4)(A) through (4)(D). Such interest shall accrue from the later of (i) the date payment of a specified amount is demanded in writing, or (ii) the date of the expenditure concerned. The rate of interest on the outstanding unpaid balance of the amounts recoverable under this section shall be the same rate as is specified for interest on investments of the Hazardous Substance Superfund established under subchapter A of chapter 98 of title 26. For purposes of applying such amendments to interest under this subsection, the term "comparable maturity" shall be determined with reference to the date on which interest accruing under this subsection commences.

CERCLA §111(a) allows EPA to use expenditures from the Superfund for response actions, including five-year review activities. CERCLA §111(e)(3) prohibits, with some exceptions, the use of Superfund money for remedial actions at Federal facilities sites.

Authority	Citation
CERCLA §111(a)	<p>(a) In general For the purposes specified in this section there is authorized to be appropriated from the Hazardous Substance Superfund established under subchapter (A) of chapter 98 of title 26 not more than \$8,500,000,000 for the 5-year period beginning on October 17, 1986, and not more than \$5,100,000,000 for the period commencing October 1, 1991, and ending September 30, 1994, and such sums shall remain available until expended. The preceding sentence constitutes a specific authorization for the funds appropriated under title II of Public Law 99-160 (relating to payment to the Hazardous Substances Trust Fund). The President shall use the money in the Fund for the following purposes . . .</p> <p>(2) Payment of any claim for necessary response costs incurred by any other person as a result of carrying out the national contingency plan established under section 1321(c) of title 33 and amended by section 9605 of this title: Provided however, That such costs must be approved under said plan and certified by the responsible Federal official.</p>
CERCLA §111(e)(3)	<p>(e) Funding requirements respecting moneys in the Fund; limitation on certain claims; Fund use outside Federal property boundaries</p> <p>(3) No money in the Fund shall be available for remedial action, other than actions specified in subsection (c) of this section, with respect to federally owned facilities. . .</p>

CERCLA §120(a)(2) provides that no department or agency may adopt or utilize any guidelines, rules, regulations, or criteria which are inconsistent with those established by EPA. This would include the requirement to conduct five-year reviews. CERCLA §120(e)(2) states that within 180 days after completion of the RI/FS, the concerned agency or department shall enter into an Interagency Agreement with EPA for effective completion of the remedial action.

Authority	Citation
CERCLA §120(a)(2)	(a) Application of chapter to Federal Government . . . (2) Application of requirements to Federal facilities All guidelines, rules, regulations, and criteria which are applicable to preliminary assessments carried out under this chapter for facilities at which hazardous substances are located, applicable to evaluations of such facilities under the National Contingency Plan, applicable to inclusion on the National Priorities List, or applicable to remedial actions at such facilities shall also be applicable to facilities which are owned or operated by a department, agency, or instrumentality of the United States in the same manner and to the extent as such guidelines, rules, regulations, and criteria are applicable to other facilities. No department, agency, or instrumentality of the United States may adopt or utilize any such guidelines, rules, regulations, or criteria which are inconsistent with the guidelines, rules, regulations, and criteria established by the Administrator under this chapter.
CERCLA §120(e)(2)	The Administrator shall review the results of each investigation and study conducted as provided in paragraph (1). Within 180 days thereafter, the head of the department, agency, or instrumentality concerned shall enter into an interagency agreement with the Administrator for the expeditious completion by such department, agency, or instrumentality of all necessary remedial action at such facility.

CERCLA §121(a) states that the President shall select a remedial action to be carried out under the response authority of CERCLA §104 and the order authority under CERCLA §106. CERCLA §121(c) provides that if the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. CERCLA §121(f)(1) requires the President to promulgate regulations that provide a State with substantial and meaningful involvement in the initiation, development, and selection of remedial actions to be undertaken in that State.

Authority	Citation
CERCLA §121(a)	<p>(a) Selection of remedial action</p> <p>The President shall select appropriate remedial actions determined to be necessary to be carried out under section 9604 of this title or secured under section 9606 of this title which are in accordance with this section and, to the extent practicable, the national contingency plan, and which provide for cost-effective response. . .</p>
CERCLA §121(c)	<p>(c) Review</p> <p>If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.</p>
CERCLA §121(f)(1)	<p>(1) The President shall promulgate regulations providing for substantial and meaningful involvement by each State in initiation, development, and selection of remedial actions to be undertaken in that State. The regulations, at a minimum, shall include each of the following:</p> <ul style="list-style-type: none"> (A) State involvement in decisions whether to perform a preliminary assessment and site inspection. (B) Allocation of responsibility for hazard ranking system scoring. (C) State concurrence in deleting sites from the National Priorities List. (D) State participation in the long-term planning process for all remedial sites within the State. (E) A reasonable opportunity for States to review and comment on each of the following: <ul style="list-style-type: none"> (i) The remedial investigation and feasibility study and all data and technical documents leading to its issuance. (ii) The planned remedial action identified in the remedial investigation and feasibility study. (iii) The engineering design following selection of the final remedial action. (iv) Other technical data and reports relating to implementation of the remedy. (v) Any proposed finding or decision by the President to exercise the authority of subsection (d)(4) of this section.

Regulatory Authority

The following citations concern EPA’s interaction with States and Indian Tribes, the provision for five-year reviews, and other topics. 40 CFR 35.6100 provides that Indian Tribes may apply for remedial response Cooperative Agreements. These Cooperative Agreements would allow Tribes to conduct five-year reviews as part of their remedial response activities. 40 CFR 35.6110 states that Indian Tribes must complete a formal application procedure for remedial response Cooperative Agreements, which is outlined in 40 CFR 35.6105. 40 CFR 300.400 (Subpart E) establishes the criteria and requirements for removal and remedial actions under CERCLA. 40 CFR 300.430(e)(2)(i) requires that remediation goals be established prior to the signing of the ROD. The requirement that newly promulgated or modified requirements of Federal or State environmental laws that could be applicable or relevant and appropriate to the circumstances at the site be examined in an ARARs review to determine if the remedy remains protective is stated in 40 CFR 300.430(f)(1)(ii)(B)(1). The requirement that five-year reviews be conducted every five-years after the initiation of the selected remedial action is listed in 40 CFR 300.430(f)(4)(ii). 40 CFR 300.500 (Subpart F) provides the criteria for State and Indian Tribe involvement in CERCLA remedial and enforcement actions. 40 CFR 515(a)(2) provides that a State’s acceptance as a support agency during an EPA-lead response shall be documented in a letter, Superfund Memorandum of Agreement, or Cooperative Agreement.

Authority	Citation
40 CFR 35.6100	Eligibility for remedial Cooperative Agreements. States, Indian Tribes, and political subdivisions may apply for remedial response Cooperative Agreements.
40 CFR 35.6110	Indian Tribe-lead remedial Cooperative Agreements. (a) Application requirements. The Indian Tribe must comply with all of the requirements described in §35.6105(a) and §35.6105(b)(5) of this subpart.
40 CFR 300.400 (Subpart E)	General... (a) This subpart establishes methods and criteria for determining the appropriate extent of response authorized by CERCLA.
40 CFR 300.430 (e)(2)(i)	(e) Feasibility study... (2) Alternatives shall be developed that protect human health and the environment by recycling waste or by eliminating, reducing, and/or controlling risks posed through each pathway by a site. The number and type of alternatives to be analyzed shall be determined at each site, taking into account the scope, characteristics, and complexity of the site problem that is being addressed. In developing and, as appropriate, screen the alternatives, the lead agency shall: (i) Establish remedial action objectives specifying contaminants and media of concern, potential exposure pathways, and remediation goals. Initially, preliminary remediation goals are developed based on readily available information, such as chemical-specific ARARs or other reliable information. Preliminary remediation goals should be modified, as necessary, as more information becomes available during the RI/FS. Final remediation goals will be determined when the remedy is selected. Remediation goals shall establish acceptable exposure levels that are protective of human health and the environment and shall be developed by considering the following.

Authority	Citation
40 CFR 300.430 (f)(1)(ii)(B)(1)	<p>(1) Requirements that are promulgated or modified after ROD signature must be attained (or waived) only when determined to be applicable or relevant and appropriate and necessary to ensure that the remedy is protective of human health and the environment.</p> <p>(Also see 55 FR 8758, and 53 FR 51440)</p>
40 CFR 300.430 (f)(4)(ii)	<p>If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.</p>
40 CFR 300.500 (Subpart F)	<p>General...</p> <p>(a) EPA shall ensure meaningful the substantial state involvement in hazardous substance response as specified in this subpart. EPA shall provide an opportunity for state participation in removal, pre-remedial, remedial, and enforcement response activities. EPA shall encourage states to enter into an EPA/state Superfund Memorandum of Agreement (SMOA) under §300.505 to increase state involvement and strengthen the EPA/state partnership.</p>
40 CFR 300.515 (a)(2)	<p>(a) General...</p> <p>(2) For EPA-lead Fund-financed remedial planning activities, including, but not limited to, remedial investigations, feasibility studies, and remedial designs, the state agency acceptance of the support agency role during an EPA-lead response shall be documented in a letter, SMOA, or cooperative agreement. Superfund state contracts are unnecessary for this purpose.</p>

Delegated Authority

Executive Order (EO) 12580 delegates authority vested in the President for CERCLA activities at Federal facilities to various Federal agencies and departments. EO §2(d) delegates the authority to conduct five-year reviews to the Departments of Defense and Energy for NPL sites under their jurisdiction, custody, or control. EO §2(f) delegates the responsibility to conduct five-year reviews to the Coast Guard at NPL sites under its jurisdiction, custody, or control with respect to any release or threatened release involving the coastal zone, Great Lakes waters, ports, and harbors. EO §2(e)(1) delegates to the heads of Executive agencies and departments the authority to conduct five-year reviews at non-NPL Federal facility sites. Section 2(g) of the EO delegates authority to conduct five-year reviews at NPL Federal facility sites to the EPA, pursuant to the exceptions in sections 2(d) and 2(f). EO §2(h) states that the requirements under CERCLA 104(c)(3) pertaining to Indian Tribes, are delegated to EPA, in consultation with the Department of Interior.

Authority	Citation
EO 12580 §2(d)	Subject to subsections (a), (b), (c), of this Section, the functions vested in the President by Sections 104(a), (b), and (c)(4), 113(k), 117(a) and (c), 119, and 121 of the Act are delegated to the Secretaries of Defense and Energy, with respect to releases or threatened releases, where either the release is on, or the sole source of the release is from, any facility or vessel under the jurisdiction, custody or control of those departments or agencies, respectively, including vessels bare-boat chartered and operated. These functions must be exercised consistent with the requirements in section 120 of the Act.
EO 12580 §2(e)(1)	Subject to subsections (a), (b), (c), and (d) of this Section, the functions vested in the President by Sections 104(a), (b), and (c)(4), 113(k), 117(a) and (c), 119, and 121 of the Act are delegated to the heads of Executive departments and agencies, with respect to remedial actions not on the National Priorities List (“the NPL”) and removal actions other than emergencies, where either the release is on, or the sole source of the release is from, any facility or vessel under the jurisdiction, custody or control of those departments or agencies, respectively, including vessels bare-boat chartered and operated. The Administrator shall define the term “emergency” solely for the purposes of this subsection, either by regulation or by a memorandum of understanding with the head of an Executive department or agency.
EO 12580 §2(f)	Subject to subsections (a), (b), (c), (d) and (e) of this Section, the functions vested in the President by Sections 104(a), (b), and (c)(4), 113(k), 117(a) and (c), 119, and 121 of the Act are delegated to the Secretary of the Department in which the Coast Guard is operating (“the Coast Guard”), with respect to any release or threatened release involving the coastal zone, Great Lakes waters, ports, and harbors.
EO 12580 §2(g)	Subject to subsections (a), (b), (c), (d), (e), and (f) of this Section, the functions vested in the President by Sections 101(24), 104(a), (b), (c)(4) and (c)(9), 113(k), 117(a) and (c), 119, 121, and 126(b) of the Act are delegated to the Administrator. The Administrator’s authority under Section 119 of the Act is retroactive to the date of the enactment of SARA.

Authority	Citation
EO 12580 §2(h)	(h) The functions vested in the President by Section 104(c)(3) of the Act are delegated to the Administrator, with respect to providing assurances for Indian tribes, to be exercised in consultation with the Secretary of the Interior.

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