



Updating Remedy Decisions at Select Superfund Sites Summary Report FY 1996 and FY 1997



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**Updating Remedy Decisions
at Select Superfund Sites
Summary Report
FY 1996 and FY 1997**

Office of Emergency and Remedial Response
U.S. Environmental Protection Agency
Washington, DC 20460

Overview

Updating Remedy Decisions initiative has been characterized as one of EPA's most successful Superfund reforms. During FY96 and FY97, EPA updated remedies at over 140 sites, reducing estimated future cleanup costs by more than \$745 million. Other key successes and findings include the following:

- ▶ Most remedy updates completed during FY96 and FY97 were the result of additional technical information gathered as part of the remedy design process. A small number of remedy updates were the result of non-technical changes in applicable, relevant and appropriate requirements (ARARs), land use, or required cleanup levels. Another small number of remedy updates were the result of State input or community preference which focused on either technical or non-technical modifications to the remedy.
- ▶ The total estimated future cost reductions (cost savings) for remedy updates in FY96 exceeded \$350 million, of which over \$325 million was based on advances in science and technology. For remedy updates completed in FY97, the total estimated cost savings exceeded \$390 million, of which over \$270 million was based on science and technology advancements. There were no remedy updates that resulted in estimated cost increases during FY96, and there were five remedy updates in FY97 with cost increases totaling an estimated \$13.5 million.
- ▶ During FY96 and FY97, most of the individual remedy updates generated estimated cost savings. These savings ranged from \$5,000 to \$82,000,000, with a majority generating estimated savings under \$10,000,000. A few remedy updates, however, generated estimated cost increases. The five remedy updates in FY97 that resulted in estimated cost increases ranged from \$300,000 to \$12,000,000.
- ▶ Remedy updates generally occurred in the remedial design phase of the cleanup process and were more likely to be documented with Explanations of Significant Differences (ESDs) than Record of Decision (ROD) Amendments. Over the 2-year period, there were 101 ESDs and 40 ROD Amendments representing remedy updates with both cost savings and increases.
- ▶ Most remedy updates in FY96 and FY97 were initiated by parties outside of EPA (e.g., potentially responsible parties (PRPs), States, communities, Federal facilities). Over the 2-year period, parties outside EPA initiated 90 updates and EPA initiated 34 updates (these numbers do not include 24 updates initiated by more than one party). These numbers are consistent with the percentage of EPA vs. non-EPA parties who conduct the actual cleanup work (e.g., since the inception of Superfund, the party lead for remedial design is approximately 70 percent non-EPA and 30 percent EPA).
- ▶ Over the 2-year period, ground water (77 updates) and soil (73 updates) were the most commonly addressed media. Another nine different media types were addressed by remedy updates during FY96 and FY97.
- ▶ Most of the remedy updates involved some kind of State participation and/or community involvement. Common forms of communication between the parties included the following: public notices, public meetings, public or State comments on the proposed plan, fact sheets, and public availability sessions.

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Appendix A: Summary of Remedy Update Decisions for FY96 and FY97

Appendix A.1: Summary of Remedy Update Information for FY96 and FY97 for
Sites Without Cost Increases

Appendix A.2: Summary of Remedy Update Information for FY96 and FY97
for Sites With Cost Increases

Appendix B: Summary of Regional Implementation Plans for FY98

1.0 Introduction

Updating Remedy Decisions, announced in the third round of Superfund reforms in October 1995, is one of a broad range of administrative reforms undertaken to improve the efficiency, speed, and fairness of cleanups in the Superfund program. Specifically, this Reform encourages the Regions to revisit selected remedy decisions at sites where significant new scientific information, technological advancements, or other considerations will protect human health and the environment while enhancing overall remedy cost effectiveness.

This report discusses remedy updates made during both FY96 and FY97, and:

- Describes the rationale and implementation of the Reform;
- Provides a summary of Superfund sites where remedies have been updated;
- Highlights estimated future cost reductions (cost savings) or cost increases expected to result from updated remedies;
- Summarizes Regional plans for implementing the reform for Fund-, PRP-, Federal facility-, and State-lead sites in FY98; and
- Presents stakeholders with information on the role of remedy updates in improving Superfund implementation.

This report should be of interest to the following parties who are typically involved in the Superfund program: EPA Regional staff, State environmental agencies, other Federal agencies, communities and community-interest groups representing residents living near Superfund sites, and regulated

parties that may be responsible for implementing the selected remedy.

2.0 Background

In 1980, when the Superfund program was established, there was little knowledge and even less experience in cleaning up hazardous waste sites. Original estimates of the number and prevalence of contaminated sites were low, and initial models of contaminant movement and behavior, particularly in ground water, were found to be too simple to explain actual site conditions. The accumulated technical and engineering experience of the 1980s and early 1990s produced major advances in the science of contaminant fate and transport modeling and remediation, illuminating initial inefficiencies in the remediation process at some sites.

EPA sought to encourage remedy updates that would incorporate such new information into existing site cleanups. Thus, in October 1995, EPA announced the Updating Remedy Decisions Reform as part of its third round of Superfund reforms. As a whole, these reforms were implemented to make Superfund cleanups faster, fairer, and more efficient.

3.0 Reform Description

The purpose of the Updating Remedy Decisions Reform is to encourage the Regions to revisit remedy decisions at certain sites where significant new scientific information, technological advancements, or other considerations will protect human health and the environment while enhancing overall remedy and cost effectiveness. Typically, these updates are made to reflect new technical information

about the characteristics or volumes of contamination present or new expectations regarding the performance of selected technologies under site-specific conditions. Further, these updates consider the implications of these factors on original decision criteria such as short- and long- term effectiveness and permanence, implementability, cost, and community acceptance.

Often, updates are also made to reflect changes in applicable, relevant, and appropriate requirements (ARARs) or other non-technical information gathered after the original decision.

While recognizing that other types of updates may be appropriate, EPA's Reform Guidance implementing the reform (Superfund Reforms: Updating Remedy Decisions, OSWER Directive 9200.2-22, dated September 27, 1996) targets updates where:

- Updating the remedy technology or strategy would generally result in a more cost-effective cleanup;
- Physical limitations are imposed by the site or where the contaminants warrant changes in the cleanup goals; and
- Site conditions warrant reducing the scope of site monitoring after cleanup (monitoring may include sampling rates, extent of analysis, or extent of reporting required).

This initiative does not signal any variations in the Agency's current policies regarding site cleanup, including policies regarding remedy selection, treatment of principal threats, preference for permanence, establishment of cleanup levels, or the degree to which remedies must protect human health and the environment. EPA remains committed to protecting public health, welfare, and the environment.

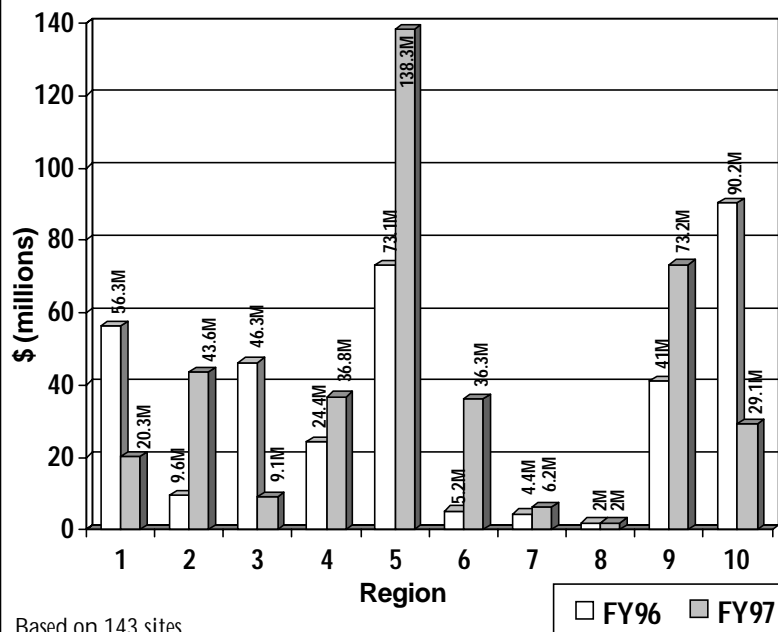
4.0 FY96 and FY97 Results

More than 140 remedy updates were completed in FY96 and FY97, saving over \$745 million in estimated site cleanup costs. Updates during FY96 resulted in a total estimated cost savings of over \$350 million of which over \$325 resulted from updates of the kind identified in the Reform Guidance. Updates during FY97 resulted in a total estimated cost savings of over \$390 million of which over \$270 million resulted from updates of the kind identified in the Reform Guidance. The difference in the estimated cost savings between all remedy updates completed during FY96 and FY97 and remedy updates identified in the Reform Guidance is that some updates were not based on new science or technology and therefore can't be counted as reform-related updates.

The estimated cost savings per update ranged from \$5,000 to \$82,000,000, with all EPA Regions reporting savings in each year reviewed. Exhibit 1 shows the amount of estimated savings by Region and by fiscal year. (Note: Exhibit 1 does not include a remedy update from the DOE Hanford site which addressed part of the overall remedy through value engineering¹ for an estimated cost savings of \$297 million.)

In addition, most of the remedy updates generated savings of less than \$10 million, as shown in Exhibit 2 (see page 3). Note: Cost estimates for several remedy updates are either unavailable to EPA or incomplete at the time of this writing. These are labeled NA/TBD (Not available/To be determined) and can be found in Appendices A.1 and A.2.

Exhibit 1:
Estimated Remedy Update Savings
by Region for FY96 and FY97



Remedy updates generated few cost increases. Only three Regions reported updated remedies which generated cost increases during FY97. The FY97 cost increases were for five remedy updates, which ranged from \$300,000 to \$12,000,000 each, and totaled \$13,500,000. No cost increases were reported for FY96.

Recent advances in the area of ground water science and remediation made these types of decisions good candidates for remedy updates. Exhibit 3 shows that during FY96 and FY97, updates of ground water remedies were the most common updates, followed closely by soil remedy updates (see page 3).

More detailed information regarding remedy updates can also be found in Appendices A, A.1 and A.2. Specific

remedy updates are listed by Region and by site, and include the following information:

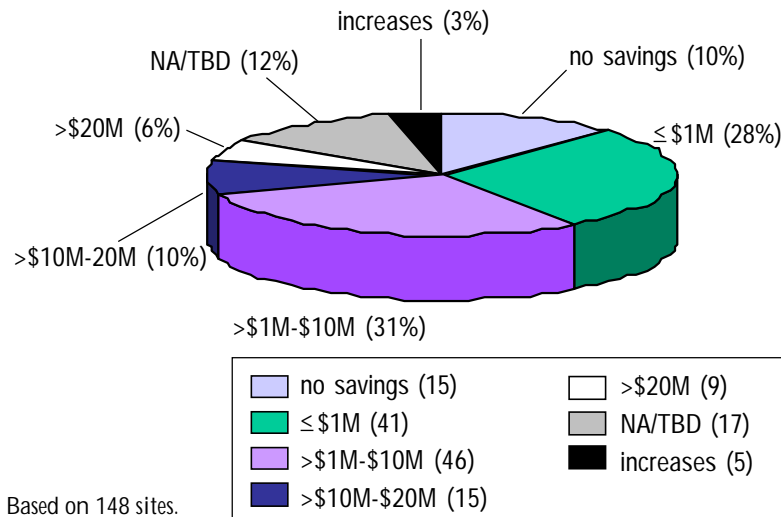
- Type and date of remedy update;
- Update initiator;
- Media involved;
- Summary of remedy change and factual basis;
- State and community involvement; and
- Estimated cost savings or cost increase.

5.0 Remedy Update Process

After a remedy decision has been completed at a site (i.e., a ROD is signed), new information may be received or generated that could

¹ Value Engineering is a highly beneficial technique used in Superfund Federal lead remedial design (RD) and remedial action (RA) projects managed by the U.S. Army Corps of Engineers (USACE) to reduce unnecessary cost in engineering projects. This is required by the Office of Management and Budget (OMB Circular No. A-131, issued January 28, 1988) to be implemented by Federal departments and agencies, when appropriate. For further information, see EPA memorandum titled, "Implementation of Value Engineering for Corps of Engineer Managed Superfund Remedial Design and Remedial Action Projects," dated June 27, 1990 and the attached fact sheet titled, "Value Engineering," OSWER Publication 9355.5-03FS, dated May 1990.

Exhibit 2: Estimated Savings Per Remedy Update for FY96 and FY97



affect how the remedy should be implemented. This information may be supplied by a potentially responsible party (PRP), the Federal agency conducting the cleanup, the support agency (e.g., other Federal agency or State/Tribe), or the public and other interested parties. Data for FY96 and FY97 indicate that more remedy updates were initiated by parties outside EPA (e.g., PRPs, States, communities, Federal facilities) than by EPA (see Exhibit 4, page 4). These numbers are consistent with the percentage of EPA vs. non-EPA parties who conduct the actual cleanup work (e.g., since the inception of Superfund, the party lead for remedial design is approximately 70 percent non-EPA and 30 percent EPA). In some cases, remedy updates have joint initiators because information arrived simultaneously from several parties. In addition, the exhibit shows that the relative percent of remedy update initiators in FY96 and FY97 were not significantly different.

Although this new information varies widely, the Reform Guidance

recommends that EPA pay particular attention to information which shows that:

- Updating the remedy may result in a more cost-effective cleanup;
- Physical limitations imposed by the site or the contaminants may warrant changes in the cleanup goals; or
- Site conditions may warrant reducing the scope of the site monitoring after cleanup.

Once new information has been collected, update requests are usually sent to the Regional Superfund manager assigned to the site. Each Region has developed protocols for considering update requests, making it easier for stakeholders to prepare and request remedy updates. Currently, no Region reports a backlog in reviewing requests made by PRPs or other parties. Appendix B presents more detail on each Region's strategy for considering remedy updates in FY98.

As outlined in the Reform Guidance, the basic process that Regions should use to consider proposed remedy

updates consists of three steps: identification and prioritization, technical review, and implementation.

- Identification and Prioritization involves assessing the update request to determine the type of change (e.g., remedial method, cleanup standards, cleanup area), the resources required to fully evaluate it, and any potential increase or decrease in protectiveness or cost. To ensure that the Region's rationale for prioritizing update reviews is clear and equitable, Regions are encouraged to carefully track all requests for remedy updates. In addition, the review and consideration of potential remedy updates should not result in any delays in the completion of work products or other remediation activities required by the existing ROD and enforcement instruments (unilateral administrative orders (UAOs) or consent decrees (CDs)).
- Technical Review evaluates the site-specific information supporting both the current remedy and

Exhibit 3: Updates by Medium in FY96 and FY97

Medium	FY96	FY97	Total
Ground Water	31	46	77
Soil	38	36	74
Surface Water	5	4	9
Debris	6	6	12
Sediment	2	10	12
Sludge	4	3	7
Leachate	5	3	8
Air	2	1	3
Solid Waste	5	3	8
Gas	1	0	1
Liquid Waste	1	0	1
Residuals	1	0	1

Based on 148 sites.

the update request. This review is conducted by the site's lead entity (e.g., the Federal agency, Federal facility, PRP, State, or Tribe).

- Implementation involves preparing and filing the necessary documentation (a note or memorandum to the Administrative Record file, an ESD, or a ROD Amendment) to support the update, consulting with the State and community, and physically conducting the updates at the site.

5.1 Determination of Remedy Update Type

Determining the type of remedy update and its documentation is a three-step process. First, EPA or another lead agency must categorize the update by asking questions about the extent to which it changes the scope, performance, or cost of the remedy selected in the ROD. This categorization then allows the lead agency to determine if the update is a nonsignificant or minor change, a significant change, or a fundamental change to the scope, performance, or cost of the original remedy. Finally, the type of change will determine which document EPA uses to update the remedy: a memorandum or letter to the Administrative Record file, an ESD, or a ROD Amendment (see NCP §300.435)

Step 1

In order to categorize the update, remedy update teams ask the following questions:

- Scope - Does the update alter the scope of the remedy (e.g., the physical area of the response, remediation goals to be achieved, and type and volume of wastes to be addressed)?
- Performance - Would the update alter the performance (e.g., treatment levels to be attained,

methodology used to achieve cleanup goals, and new technology not considered in the original ROD) and thus raise concerns about the protectiveness or long-term effectiveness of the remedy that could not have been anticipated?

- Cost - Does the update alter remedial costs and are the changes in costs of such a nature that they could not have been anticipated based on: (1) the estimates in the ROD; and (2) the recognized uncertainties associated with the hazardous waste engineering process selected?

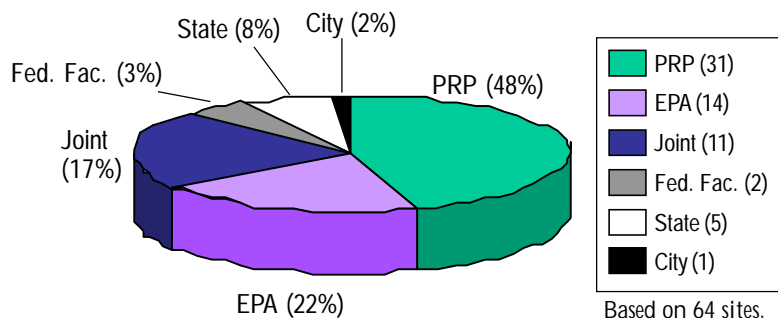
Step 2

Based on this evaluation, and depending on the extent or scope of the modification being considered, the lead agency must determine the type of update involved (i.e.,

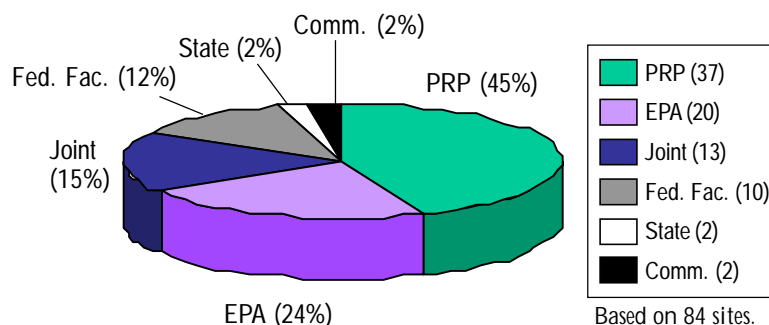
nonsignificant or minor, significant, or fundamental change to the scope, performance, or cost of the original remedy). An aggregate of nonsignificant or significant changes could result in a fundamental change overall. Post-ROD updates fit into one of these categories:

- A nonsignificant or minor change usually arises during design or construction when modifications are made to the functional specifications of the remedy to optimize performance and minimize cost. Such changes may affect the type or cost of materials, equipment, facilities, services, and supplies used to implement the remedy. The changes will not have a major impact on the scope, performance or cost of the remedy and will not require a modification of an enforcement decision document (e.g., consent order or decree).

Exhibit 4:
Remedy Update Initiators for FY96



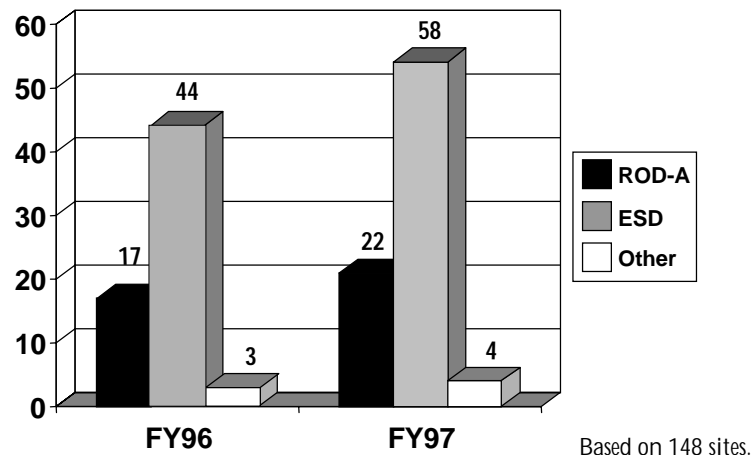
Remedy Update Initiators for FY97



Minor changes might include a slight increase in the volume of treated soil, a change in disposal location, or a modification in ground water monitoring specifications.

- A significant change generally involves incremental change to a component of a remedy that does not fundamentally alter the overall remedial approach. Significant changes to a component of a remedy may result from an enforcement action or be part of a settlement or consent decree concluded after EPA signs the ROD. Depending on the significance of the change, a formal public comment period may be conducted and an enforcement decision document may need to be modified. EPA will generally consult with the Department of Justice as soon as the Region believes the remedy update will require modification of any related consent order or decree. A significant change might involve an increase of over 50 percent in the volume of soil to be remediated, a change in reasonably anticipated land use following the remedy, or a change in an ARAR that affects cleanup levels and other parameters.
- A fundamental change involves an appreciable change or changes in the scope, performance, and/or cost of a remedy or may involve a number of significant changes that together have the effect of a fundamental change. Fundamental changes result in a reconsideration of the waste management approach (e.g., change in the primary remedy for the wastes, residual risk, cleanup technology) selected in the original ROD and must include a formal public comment period. Generally, a fundamental change will lead to modification of the settlement document, obligating

Exhibit 5: ESDs vs. ROD Amendments



the settling parties to implement the response work in question. EPA routinely consults with the Department of Justice regarding any changes it believes are needed in a settlement document. A fundamental change might involve selecting a different primary treatment technology because of community preference, discovery of additional contaminants, or the determination that less treatment is needed than originally expected.

Step 3

The type of change will determine which document EPA uses to update the remedy: a memorandum or note to the Administrative Record for a nonsignificant or minor change; an ESD for a significant change; or a ROD Amendment for a fundamental change. Exhibit 5 indicates the number of ESDs, ROD Amendments, and other documents used for remedy updates in FY96 and FY97.

Two years of reform data show that, in general, remedy updates tend to occur during remedy design and represent a significant but not fundamental change to the remedy. Consequently, most remedy updates correspond to at least one of the following situations: the

scope of the remedy has changed (e.g., volume reduction); the performance of the remedy can be modified or optimized (e.g., change in disposal or discharge point); or there is a more cost-effective way to implement the remedy.

In rare situations, the original remedy does not meet the required cleanup levels specified in the ROD, thus the determination for an updated remedy may result in estimated cost increases.

5.2 Cost as a Remedy Update Driver

Cost plays a significant role throughout the entire remedy selection process and is one of three factors generally considered when determining the type of remedy update (as mentioned in Section 5.1). For more information on the use of cost in the selection of remedial actions, see EPA's fact sheet, "The Role of Cost on the Superfund Remedy Selection Process" (OSWER 9200.3-23FS, dated September 1996). This section describes in more detail the procedures for estimating cleanup cost from

remedy selection through the remedy update.

Procedures for Estimating Original Remedy Cost

At the beginning stages of the remedy selection process, cleanup options are often broadly described in a qualitative manner and the project scope and schedule are not well defined. This occurs because it is extremely difficult to develop a cost estimate for a project when there's uncertainty about materials and labor that will be required or specific activities that will take place during the remedial action.

As the site progresses through the Superfund pipeline and the remedy is designed, initial remedy cost estimates are refined and their accuracy with respect to the actual project cost increases. As a general matter, the initial cost estimates used as a basis for the remedy updates described in this report are developed early during the Superfund process when estimates are expected to vary.

In the Superfund program, initial cost estimates are developed during the remedial investigation/feasibility study (RI/FS). During the FS, a cost estimate is developed for each cleanup alternative to be considered during the remedy selection process. The ROD presents the selected remedy and decisionmaking rationale, including the cost estimate for the selected cleanup activity.

Due to the challenges associated with accurately characterizing sites before the remedial design/remedial action (RD/RA) phase, the cost of remedial actions at the FS stage is based on engineering assumptions and data that need to be verified and more accurately defined during RD. Recognizing this fundamental

limitation, EPA established an accuracy expectation for cleanup cost estimates that are developed during the FS as part of the remedy selection process. The estimate should be accurate within a range of plus 50 to minus 30 percent. This means that a study with an estimate of \$100,000 could ultimately cost between \$70,000 and \$150,000.

Feasibility cost estimates are calculated using:

- Direct capital costs, which include costs of construction, equipment, buildings, and relocation;
- Indirect capital costs, which include engineering and design as well as contingency allowances [see below]; and
- Operation and maintenance (O&M) costs, which include the cost of operating and maintaining the remedy during a projected time period.

Contingencies are also factored into the remedy cost estimate. Contingencies are specific provisions for unforeseen circumstances which may result in additional costs (e.g., adverse weather conditions, inadequate site characterization). The contingency is used to reduce the risk of cost overruns and should be factored into capital and O&M cost estimates developed during the FS.

Procedures for Estimating Updated Remedy Cost

The cost effects of a potential remedy update generally are first assessed by the Region during the prioritization phase of the remedy update process once the sites have been prioritized based on the potential effects on the human health protection provided for in the original remedy and the update's effect on the schedule of the selected

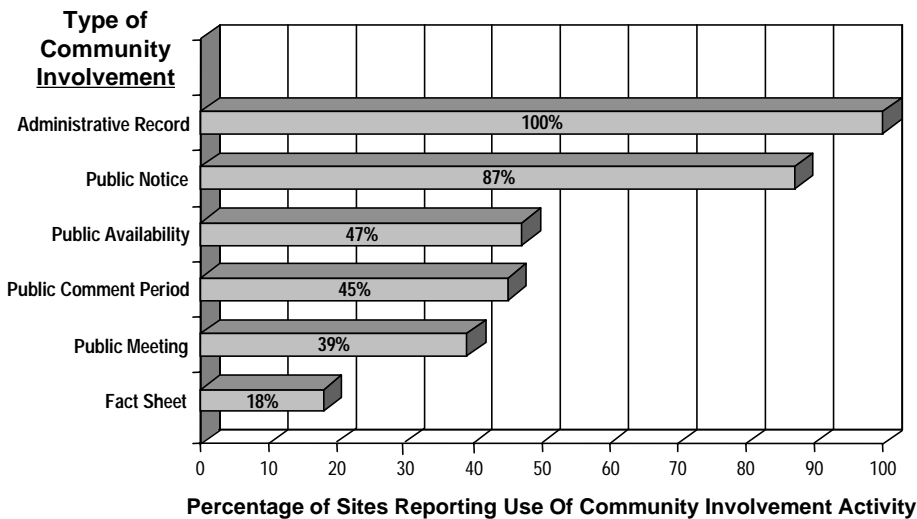
remedy. The Region decides if the remedy is appropriate for review by determining the significance of the potential update's impact on cost. In addition, the Region considers the potential remedy update's proportion of the total remedy cost, the implementation cost of the update, and the resources required to review and update the remedy. The latter expenditures may include, according to the OSWER Directive "Superfund Reforms: Updating Remedy Decisions at Select Sites," "the administrative costs of modifying a remedy, which may include preparation of an ESD or ROD Amendment, responding to the concerns of parties affected by the remedy change, and modifying or renegotiating unilateral administrative orders (UAOs) or consent decrees."

Remedy updates have similar uncertainties about material and labor as the original remedy cost estimates, and thus have some variables built into the updated cost estimates (plus 50 to minus 30 percent).

When Regional remedy update teams compare costs, they compare the updated remedy costs to original remedy costs, both of which account for some uncertainty during the remedial process. For this reason, it is necessary to emphasize that the estimated savings for each remedy update represent just that, an estimate, and is not meant to be an exact figure. Only as the remedy progresses towards construction completion will the actual savings or cost increases be known. In addition, because cost savings estimates compare original remedy costs to updated remedy costs, any work completed as part of the original remedy is not included in the savings estimates. However, the effect of these expenditures is negligible since most updates occur early in remedy design.

Exhibit 6: Community Involvement at Sites with Remedy Updates

This chart summarizes data from a random representative sample of 79 ESDs, ROD Amendments, and Letters to File from both FY96 and FY97 (39 from FY96 and 40 from FY97).



5.3 State/Tribal and Community Roles

State/Tribal

States play an important role in the modification of remedy decisions. Both the NCP §300.515 and the Model CERCLA RD/RA Consent Decree (which forms the basis for most consent decrees) provide an opportunity for States to review and comment on specified steps in remedy selection. Agreements between EPA and States, including contracts, may require modification following a remedy update. Furthermore, the Model Consent Decree states that the EPA will provide the State with a reasonable opportunity to review and comment on any proposed modifications. Further information regarding the role of States and supporting agencies in the remedy modification process can be found

in the "Interim Final Guidance on Preparing Superfund Decision Documents," OSWER Directive 9335.3-02 (October 1989).

Native American Tribes are afforded substantially the same treatment as States with respect to certain provisions of CERCLA (see CERCLA §126; NCP §300.505). A Tribe that is Federally recognized, has a governing body that is currently performing governmental functions regarding environmental protection, and has jurisdiction over a Superfund site can be treated essentially the same as a State (see NCP §300.515).

Community

Although the initiation of a formal public comment period is required only in the case of a fundamental update (i.e., ROD Amendment), most remedy updates, regardless of

their significance, have a substantial community involvement component (see NCP §300.435(c)(2)(i) and (ii)). For example, documents pertaining to the site, including any information on remedy updates, are placed in the Administrative Record or at the site repository located in the area of the site (e.g., local library). Other activities, including a public availability session, public meetings, issuance of fact sheets about the site, and the release of an amended proposed plan, may allow the surrounding community and other interested parties an opportunity to learn more about the site and present their opinions on remedial activities.

Most remedy updates in FY96 and FY97 involved State participation and/or community involvement. Common forms of communication between the parties are shown in Exhibit 6.

5.4 Remedy Review Duration

Time taken to review site-specific material and complete the memorandum, ESD, or ROD Amendment, was generally less than a year for most remedy updates completed during FY96 and FY97. As demonstrated in Exhibit 7, most of the ESDs and ROD Amendments issued took less than one year to complete. A brief survey of sites with longer remedy review times shows that these durations can be influenced by:

- A lengthy, but important, public involvement phase;
- A protracted verification/pilot test period following the discovery of new performance, technical, or toxicological data;
- The discovery of unexpected contamination late in the remedy design phase; or
- A redefinition of land use.

Specific examples of remedy changes whose reviews lasted more than one year may be found in Section 6.2.

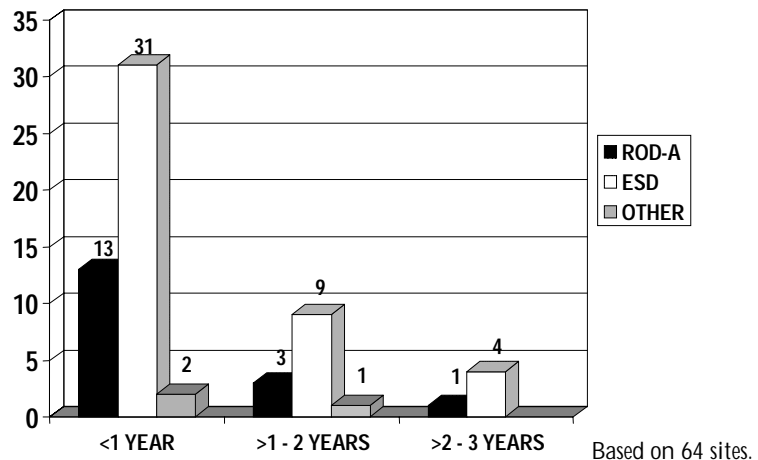
6.0 Lessons Learned

Through two years of reform implementation, EPA has gained insight into ways of successfully updating site remedies. The following section details information collected regarding reform benefits, site examples, and comments from stakeholders.

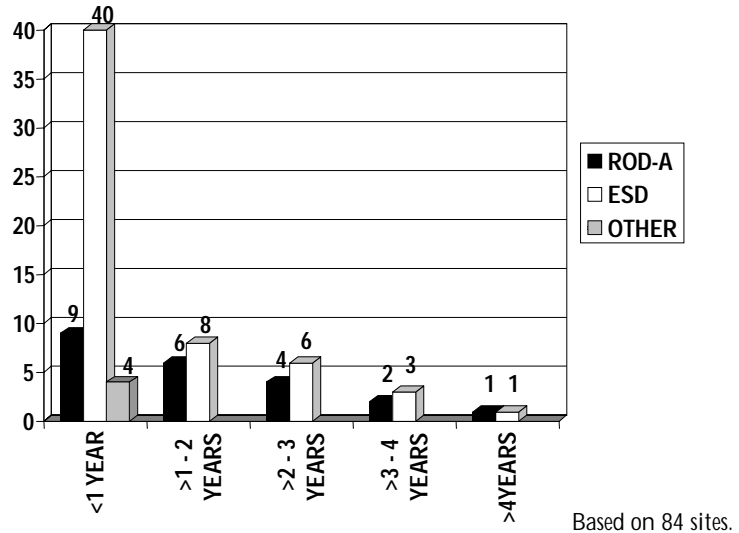
6.1 Benefits

This reform has been very successful in bringing past decisions in line with current science and technology. By doing so, these updates improve the cost-effectiveness of site remediation while ensuring reliable short- and long-term protection of human health and the environment. The quantifi-

Exhibit 7:
Approximate Review Time for
Remedy Updates in FY96



Approximate Review Time for
Remedy Updates in FY97



able results of this reform have been announced in EPA's testimony before Congress, private industry evaluations of Superfund reforms, and a report of the U.S. General Accounting Office. Of additional note is EPA's overwhelmingly positive record of responding to remedy update requests made by outside parties.

6.2 Site Examples

In many cases, remedies were updated because of a decrease or increase in contaminant volume or because of the inability to achieve desired results in a test of the ROD-selected treatment or containment technology during the remedial design phase of the cleanup. Al-

though all updates described in Appendices A and B represent site-specific situations, it is possible to use some as site examples of several trends. The following represent examples of some remedy update situations that occurred during FY96 and FY97.

Updates Based on New Technology

Some updates were the result of new technology that wasn't considered in the original remedy. At the Davis Liquid Waste site in Rhode Island, United Technologies proposed an update based on performance data. This data indicated the increased effectiveness and reduced implementation costs of using thermal desorption instead of incineration, resulting in a savings of \$5 million. In some cases, the selection of a new technology will substantially reduce the cleanup time, such as at Avco Lycoming in Pennsylvania. Here Avco/Textron Lycoming proposed a remedy update based on successful pilot tests of molasses injection for metals treatment and air sparging/soil vapor extraction for organics treatment. This update reduces the cleanup time by 33 percent and saves an estimated \$5.3 million.

Updates Based on New Performance Data

New performance data can provide the needed information for updating remedies. The update at Auburn Road Landfill in Massachusetts reflects an approach to ground water contamination that relied on modeling and two years of performance data. The remedy was updated from pump and treat to monitored natural attenuation once it was proven that volatile organic compound (VOC) levels had dropped below cleanup levels in most areas, saving \$12 million. At

the Coakley Landfill site in New Hampshire, Coakley Landfill Group gathered new data during the pre-design phase of the remedy. This data indicated lower gas production volumes so that a passive gas collection and venting system could be substituted for the costlier active collection and incineration option. This remedy modification resulted in \$0.7 million estimated savings.

Coordinating the Update

Some remedy updates involve coordination among EPA, other Federal agencies, and State and local government agencies. One remedy update was tied to county redevelopment (Rentokil, Virginia), while two other updates involved discussions with several parties as part of a technical impracticability (TI) waiver determination. For example, at the Crystal Chemical site in Texas, Southern Pacific Transportation substituted a slurry wall containment remedy for a pump and treat remedy after proving that restoration of ground water at some parts of the site was deemed technically impracticable, resulting in estimated savings of \$2.8 million. At the South Municipal Water Supply Well site in New Hampshire, EPA granted a TI waiver due to the discovery of dense non-aqueous phase liquids (DNAPLs) during pre-design sampling. This saved an estimated \$3.5 million.

State Input in the Update

States can be either the lead or the support agency for a remedy update. For example, at the Kummer Sanitary Landfill in Minnesota, the State initiated the remedy update, conducted public involvement activities, and wrote a ROD Amendment to change a remedy based on the availability of additional site data to save an estimated \$5.6 million.

Community Preference

Community involvement can be the basis for the remedy update and, in some cases, may conflict with the best technology available to address the contamination. During one update at the Brown's Battery Breaking site in Pennsylvania, the community preferred a different location for the treatment facility, while during another remedy update (at the Tucson International Airport in Arizona), the community preferred a method for ground water discharge that differed from the original remedy which discharged treated ground water to the local water distribution system.

Cost Increases

Although the Reform Guidance is aimed at controlling site costs, there are remedy updates that result in cost increases, especially when data discovered during remedial design demonstrates that a selected technology does not function under current conditions at the site. For example, at the Robintech site in New York, Buffton Corporation gathered additional information during the design phase which indicated that the geology of the shallow aquifer was unsuitable to implement the previously selected ground water extraction systems. For this reason, the treatment was changed to excavation and treatment using low temperature thermal desorption for soils, monitored natural attenuation for shallow aquifer ground water, and pump and treat of water from the bedrock aquifer, increasing the cost of the remedy by an estimated \$0.7 million. At the Imperial Oil/Champion Chemical site in New Jersey, sampling conducted during the design phase revealed a higher level of soil contamination than previously thought. This discovery resulted in additional excavation and

off-site disposal at a cost yet to be determined.

Timeframe for Completing Remedy Updates

The time needed to complete an update varies with each site. For example, the ground water remedy at Savannah River, South Carolina, was updated in as little as 11 days. Department of Energy testing during the remedial action (RA) phase demonstrated that a recirculation well was not effective. EPA decided to remove the well from the treatment plan, saving an estimated \$0.1 million. The soil/sediment remedy at the Cleveland Mill site in New Mexico was updated in only one month. The Mining Remedial Recovery Company proposed updating the remedy to onsite containment when a large volume of acid mine runoff caused the need for an immediate response. Additionally, a soil/sludge remedy was proposed by GATX Corporation and updated in one month at the Saegertown Industrial Area in Pennsylvania. At this site, off-site thermal treatment facilities were expanded to include a different type of boiler, resulting in a savings of \$4.6 million.

Other updates do not occur so quickly, as at the Preferred Plating site in New York. At this site, the ground water remedy update took over three years to complete but saved an estimated \$9.3 million. The remedy was updated from active extraction and treatment to monitored natural attenuation because sampling identified space restrictions and a "natural" decline in contaminant concentrations over time. The review for a soil remedy update at the Koppers (Oroville) site in California site took over two years to complete. Unfavorable treatability testing results, the

Stakeholder Comments

In the Chemical Manufacturers Association's Report, "A Chemical Industry Perspective on EPA's Superfund Administrative Reforms," April 1997, the following quotes were made:

"Of the five reforms covered in this report, the updating of previous RODs reform generated the most positive comments, both from PRPs and from EPA (pg. 15);"

"In sum, this reform has produced the greatest tangible benefits of any of EPA's Superfund administrative reforms (pg. 18);"

"PRPs confirm that some remedies are being updated and that additional petitions to update remedies are pending (pg. 15);" and

"Of all of the EPA reforms announced in October, 1995, this is the one that has produced the most tangible results (pg. 17)."

In their December 1996 report, "EPA's Superfund Reforms: A Report on the First Year of Implementation," the Superfund Settlements Project said:

"In another key reform aimed at making 'smarter cleanup choices,' EPA will now entertain requests to updates earlier remedy decisions when significant new scientific information or technological advances will achieve the same level of protectiveness at lower cost" (pg.8); and

"Significantly, although the EPA Headquarter guidance focused primarily on DNAPLs in ground water, both Regions [I and III] have applied EPA's guidance to remedies outside the DNAPL context. In fact, several sites involved updating old remedies calling for on-site incineration and adopting thermal desorption (e.g., Davis Liquid Waste) or off-site incineration (e.g., Saunders Supply Co.) (pg.20).

discovery of more extensive mixed contamination, and a change in land use scenario resulted in a remedy update that may save an estimated \$15 million.

6.3 Update Requests Can Be Denied

Not all remedy update requests are approved by EPA. Some have proposed remedy updates that are not as protective or reliable as the original remedy. At the Sharkey Landfill site in New Jersey, the proposal to modify the capping

remedy was denied because it was not protective of the environment. At the Chem-Solv Site in Delaware, the request to update the remedy by eliminating ground water protection was denied because sampling of the local ground water supply down gradient of the site demonstrated the continuing threat posed by the site. Even though an update request has been denied, new information may be gathered and another update may be submitted at a later time.

Guidance currently under development by EPA. Specific questions on implementation of this reform may be directed to Matt Charsky of the Office of Emergency and Remedial Response by telephone at (703) 603-8777 or e-mail at charsky.matthew@epamail.epa.gov or FAX at (703) 603-9133. Each Region also has a remedy update contact who can be accessed by contacting the Superfund Program area in any of EPA's 10 Regional offices.

7.0 Conclusion

Generally, EPA and outside parties consider the Updating Remedy Decisions reform a success during both FY96 and FY97. The number of remedies updated by each Region during both FY96 and FY97 clearly shows that all 10 Regions are implementing this reform, with most Regions reporting estimated cost savings above \$50 million for the 2 fiscal years combined. The Regional implementation plans for FY98 do not signal any change to the current remedy updating process. All 10 Regions continue to evaluate requests to review old Fund-lead remedies as well as consider updates to more recent remedies that may not be up-to-date with current science or technology. Regions continue to encourage outside parties to submit remedy update requests to EPA when new technical information exists to support them. For the most part, EPA and outside parties share the benefits of both cost and time savings as part of implementing the update in remedy.

Interested parties should review the existing Reform Guidance (OSWER Directive 9200.2-22) for basic information concerning the reform.² Additional guidance on remedy updates will also be included in the updated Record of Decision

Acknowledgements

This report is a reality because of the dedicated efforts of numerous EPA Superfund staff. Regional remedial project managers (RPMs) responsible for considering and implementing remedy updates at Superfund sites are to be commended for making these changes so that the best technologies available are in place at all sites nationwide.

This report was prepared for EPA under contract #68-W6-0038.

² The Reform Guidance can be accessed through the Internet at <http://www.epa.gov/superfund/oerr/remedy.htm>.

Appendix A:
Summary of Updated Remedy Decisions
for FY96 and FY97

NOTE: The information and data presented in Appendix A have been supplied to EPA Headquarters by Regional offices. The data is subject to occasional updates as new information is received, thus Appendix A data should be used for informational purposes only.

Appendix A:
SUMMARY OF UPDATED REMEDY DECISIONS FOR FY96

Reg.	# With No Sav.	# of TBD	# With Est. Sav.	# With Est. Incr.	Est. Savings	Est. Increase	Change Initiator			Type of Change		
1	1	0	5	0	\$56.3M	\$0	2 PRP 1 JOINT	2 EPA	1 STATE	4 ESD	1 ROD-A	1 Memo
2	0	0	1	0	\$9.6M	\$0	1 PRP			1 ESD		
3	0	1	13	0	\$46.3M	\$0	10 PRP	1 EPA	3 JOINT	11 ESD	3 ROD-A	
4	4	0	6	0	\$24.4M	\$0	3 PRP 1 STATE	4 EPA	2 JOINT	7 ESD	3 ROD-A	
5	0	0	7	0	\$73.1M	\$0	3 PRP 2 JOINT	1 EPA	1 STATE	3 ESD	4 ROD-A	
6	1	0	3	0	\$5.2M	\$0	2 PRP	2 EPA		3 ESD	1 ROD-A	
7	1	2	5	0	\$4.4M	\$0	3 PRP 1 CITY	2 EPA	2 STATE	5 ESD	1 ROD-A	2 Letters
8	0	1	3	0	\$2.0M	\$0	2 PRP	1 EPA	1 JOINT	4 ESD		
9	1	3	3	0	\$41.2M	\$0	3 PRP 2 JOINT	2 FED FAC		5 ESD	2 ROD-A	
10	0	0	3	0	\$90.2M	\$0	2 PRP	1 EPA		1 ESD	2 ROD-A	
Totals	8	7	49	0	\$352.7M	\$0	31 PRP 5 STATE 1 CITY	14 EPA 2 FED FAC	11 JOINT	44 ESD	17 ROD-A	3 Other
<hr/>							<hr/>			<hr/>		
64 sites							64 sites			64 sites		

**Appendix A:
SUMMARY OF UPDATED REMEDY DECISIONS FOR FY97**

Reg.	# With No Sav.	# of TBD	# With Est. Sav.	# With Est. Incr.	Est. Savings	Est. Increase	Change Initiator	Type of Change
1	0	0	6	0	\$20.3M	\$0	2 PRP 3 EPA 1 STATE	5 ESD 1 ROD-A
2	1	2	6	1 (+1TBD)	\$43.6M	\$0.7M	1 PRP 6 EPA 4 JOINT	7 ESD 4 ROD-A
3	2	2	7	0	\$9.1M	\$0	6 PRP 2 EPA 1 FED FAC 1 JOINT 1 COMM	9 ESD 2 ROD-A
4	1	2	8	2	\$36.8M	\$12.3M	6 PRP 3 EPA 3 FED FAC 1 JOINT	8 ESD 5 ROD-A
5	0	2	14	0	\$138.3M	\$0	10 PRP 2 EPA 4 JOINT	11 ESD 5 ROD-A
6	1	0	5	0	\$36.3M	\$0	4 PRP 1 JOINT 1 COMM	2 ESD 3 ROD-A 1 Other
7	1	0	2	0	\$6.2M	\$0	2 PRP 1 FED FAC	1 ESD 2 Letters
8	2	0	2	0	\$2.0M	\$0	2 EPA 1 FED FAC 1 JOINT	3 ESD 1 Other
9	3	1	4	1	\$73.2M	\$0.5M	3 PRP 2 EPA 4 FED FAC	9 ESD
10	0	0	5	0	\$29.1M*	\$0	3 PRP 1 STATE 1 JOINT	3 ESD 2 ROD-A
Totals	11	9	59	4+1TBD	\$394.9M	\$13.5M	37 PRP 20 EPA 13 JOINT 10 FED FAC 2 STATE 2 COMM	58 ESD 22 ROD-A 4 Other
<hr/>				<hr/>				<hr/>
84 sites				84 sites				84 sites

* Not included is the DOE Hanford site which has an estimated cost savings of \$297 million.

Appendix A.1:
**Summary of Remedy Update Information for FY96 and
FY97 for Sites Without Cost Increases**

NOTE: The information and data presented in Appendix A.1 represents only a portion of the information available in the decision document. If more information is needed, please refer to the site's ESD, ROD-Amendment, memo-to-file, or letter.

Appendix A.1:
Summary of Remedy Update Information for FY96 and FY97 for Sites Without Cost Increases

Region Site Name, State	Date of <u>Original ROD</u> Date of Change [ESD/ROD-A]	Date Review <u>Commenced</u> Date Review Completed	Change Initiator	Media	State/ Community Involvement	Est'd Resource Demands - <u>Fed/Contr.</u> Est'd Cost Savings
Region 1 - FY97						
Region 1 Auburn Road Landfill, NH	9/29/89 12/19/96 [ROD-A]	1993 7/1/96	EPA	Groundwater	State helped compile ROD; public notified; public comment period; public meeting held. State concurred.	Fed = 250 hrs; Contr. = \$0 Est'd Savings = \$12 million
Type of Change: From - pump and treat of groundwater; To - monitored natural attenuation and long-term monitoring.						
Factual Basis: Groundwater modeling and two years of performance data show VOC contamination fell below cleanup levels; no pump and treat facility to be built.						
Region 1 Groveland Wells, MA	9/30/91 11/15/96 [ESD]	1/30/96 11/15/96	EPA	Groundwater	State concurred; public notice and fact sheet issued; public comment period; public meeting held.	Fed = 500 hrs; Contr. = \$0 Est'd Savings = \$1.6 million
Type of Change: From - Treatment system to treat entire plume; To - reduced size of treatment system, and From - active treatment in less concentrated portion of plume; To - monitored natural attenuation.						
Factual Basis: New field data obtained by EPA during remedy design; reduced volume of groundwater to be pumped and treated.						
Region 1 PSC Resources, MA	9/15/92 11/26/96 [ESD]	3/96 11/96	PRP	Sediment, Soil	Comment on ESD; public notice; public meeting.	Fed = 400 hrs; Contr. = \$0 Est'd Savings = \$1 million
Type of Change: From - in-situ stabilization; To - ex-situ stabilization, and From - permeable cap; To - impermeable cap.						
Factual Basis: Needed improved means of stabilizing soils and sediments, physical obstacles impeded in-situ mixing.						

Region Site Name, State	Date of Original ROD Date of Change [ESD/ROD-A]	Date Review Commenced Date Review Completed	Change Initiator	Media	State/ Community Involvement	Est'd Resource Demands - Fed/Contr. Est'd Cost Savings
Region 1 Salem Acres, MA	3/25/93	3/1/97	PRP	Sediment, Soil	State concurred; public notified.	Fed = 200 hrs; Contr. = \$0
	4/11/97 [ESD]	4/11/97				Est'd Savings = \$0.7 million
	Type of Change: From - original ROD cleanup levels; To - reduced soil cleanup levels.					
	Factual Basis: ESD established cleanup levels for carcinogenic PAHs for which there previously were no levels.					
Region 1 Savage Municipal Water Supply Well, NH	9/27/91	6/1/95	State	Groundwater	State proposed changes; public meeting held by State.	Fed = 390 hrs; Contr. = \$10,000
	12/9/96 [ESD]	12/9/96				Est'd Savings = \$1.5 million
	Type of Change: From - extract and treat using ultraviolet oxidation; To - air stripping with carbon adsorption; add slurry wall, extraction wells, and soil vapor extraction system.					
	Factual Basis: Design studies revealed presence of DNAPLs.					
Region 1 South Municipal Water Supply Well, NH	9/27/89	5/15/96	EPA	Groundwater, Soil	State concurred; public notified; public comment period; no community comments.	Fed = 300 hrs; Contr. = \$5,000
	2/3/97 [ESD]	1/29/97				Est'd Savings = \$3.5 million
	Type of Change: From - groundwater treatment and soil vacuum extraction; To - hydraulic containment.					
	Factual Basis: DNAPLs found in pre-design data; technical impracticability waiver was granted.					

Region Site Name, State	Date of Original ROD Date of Change [ESD/ROD-A]	Date Review Commenced Date Review Completed	Change Initiator	Media	State/ Community Involvement	Est'd Resource Demands - Fed/Contr. Est'd Cost Savings
Region 1 - FY96						
Region 1 Coakley Landfill, NH	6/28/90 5/17/96 [ESD]	3/8/96 4/11/96	PRP	Landfill gas	State concurred; public comment period; no community comments.	Fed. = 80 hrs; Contr. = \$1,000 Est'd Savings = \$0.7 million
Type of Change: From - active landfill gas collection and incineration; To - passive collection and venting.						
Factual Basis: New data in pre-design indicated lower gas production volumes.						
Region 1 Davis Liquid Waste, RI	9/29/87 7/19/96 [ESD]	4/21/94 3/25/96	PRP	Soil	State concurred; no comments from community except 2 non-settling PRPs.	Fed = 150 hrs; Contr. = \$0 Est'd Savings = \$5 million
Type of Change: From - on-site incineration; To - on-site low temperature thermal desorption.						
Factual Basis: Performance data indicated increased effectiveness and reduced implementation costs using new technology.						
Region 1 Gilson Road, NH	9/22/83 12/29/95 [Other: memo]	9/30/94 12/29/95	State	Groundwater	State responsible for change; public notified.	Fed = 120 hrs; Contr. = \$0 Est'd Savings = \$3.6 million
Type of Change: From - groundwater pump and treat; To - monitoring only.						
Factual Basis: Remedy attained ROD remediation goals and met alternate concentration limits for groundwater.						

Region Site Name, State	Date of <u>Original ROD</u> Date of Change [ESD/ROD-A]	Date Review <u>Commenced</u> Date Review Completed	Change Initiator	Media	State/ Community Involvement	Est'd Resource Demands - <u>Fed/Contr.</u> Est'd Cost Savings
Region 1 Landfill & Resource Recovery, RI	9/29/88	6/96	EPA, PRP	Landfill debris (that could migrate to groundwater)	State reviewed draft ESD and deferred concurrence until resolution of an existing State consent order; ESD will be made part of Administrative Record; community not involved.	Fed = 60 hrs; Contr. = \$0
	9/16/96 [ESD]	9/16/96				Est'd Savings = no analysis of cost savings
	Type of Change: From - groundwater cleanup not directly required in ROD; To - clarification of groundwater performance standards, for example, maximum contaminant levels (MCLs) to be used to evaluate performance of landfill closure.					
	Factual Basis: Clarify that MCLs were included in the original ROD to monitor the integrity of the landfill closure and provide maximum protection to groundwater.					
Region 1 Norwood PCB, MA	9/29/89	5/95	EPA	Sediment, Soil, Building Material	Revised remedy sent to State/community for review during public comment period. State concurred.	Fed = 500 hrs; Contr. = \$0
	5/17/96 [ROD-A]	5/17/96				Est'd Savings = \$45 million
	Type of Change: From - on-site solvent extraction; To - on-site consolidation under impermeable asphalt cap and From - building remediation; To - building demolition.					
	Factual Basis: ROD treatment impracticable due to space constraints and safety issues; new cleanup goals based on future land use and changes in risk assessment methodologies; new remedy more cost-effective.					
Region 1 Pinettes Salvage Yard, ME	5/30/89	3/25/95	EPA	Groundwater	Town consulted; State involved in review; announcement made to community.	Fed = 580 hrs.; Contr. = \$0
	6/20/96 [ESD]	6/20/96				Est'd Savings = \$2 million
	Type of Change: From - pump and treat; To - monitored natural attenuation and institutional controls.					
	Factual Basis: New data from monitoring revealed VOCs below ROD action levels.					

Region Site Name, State	Date of Original ROD Date of Change [ESD/ROD-A]	Date Review Commenced Date Review Completed	Change Initiator	Media	State/ Community Involvement	Est'd Resource Demands - Fed/Contr. Est'd Cost Savings
Region 2 - FY97						
Region 2 American Thermostat, NY <i>* Initial cost increase, overall cost decrease.</i>	6/29/90 7/97 [ESD]	3/95 5/95	EPA	Groundwater, Soil	Full State involvement; community expressed little interest.	Fed = 100 hrs; Contr. = \$0 Est'd Savings = not available*
Type of Change: From - excavation and thermal treatment of unsaturated soils and groundwater; To - removal and treatment of soils in several "hot spot" areas.						
Factual Basis: Pre-design sampling revealed additional soil contamination; removal of soil (source of groundwater contamination) will shorten length of groundwater treatment process.						
Region 2 DeRewal Chemical Company, NJ	9/29/89 6/12/97 [ESD]	1/96 7/96	EPA	Soil	Full State involvement; State concurred; public notice given; community expressed interest and was supportive.	Fed = 100 hrs; Contr. = \$0 Est'd Savings = TBD
Type of Change: From - on-site solidification/stabilization of inorganic-contaminated soil and backfill of treated soil; To - no on-site treatment of inorganics and off-site disposal.						
Factual Basis: Treatability study results in design showed original remedy would leach inorganics if left in place.						
Region 2 Haviland, NY	9/87 8/97 [ROD-A]	12/95 8/96	EPA	Groundwater	Full State and community involvement; local officials objected to change in water supply portion of remedy.	Fed = 500 hrs; Contr. = \$0 Est'd Savings = \$4.2 million
Type of Change: From - groundwater pump and treat and alternate water supply; To - monitored natural attenuation and monitoring and maintenance of existing home systems.						
Factual Basis: Recent data showed decrease in levels of contamination.						

Region Site Name, State	Date of <u>Original ROD</u> Date of Change [ESD/ROD-A]	Date Review <u>Commenced</u> Date Review Completed	Change Initiator	Media	State/ Community Involvement	Est'd Resource Demands - <u>Fed/Contr.</u> Est'd Cost Savings
Region 2 Love Canal, NY	10/87 11/96 [2 nd ESD]	3/96 11/96	EPA, PRP	Sediments	State was fully involved; public somewhat interested.	Fed = 200 hrs; Contr. = \$0 Est'd Savings = \$10 million
Type of Change: From - off-site incineration of creek and sewer sediments at PRP facility; To - off-site incineration or disposal of creek and sewer sediments at commercial facility.						
Factual Basis: Dioxin disposal classification of 1 ppb as the action level that would require treatment of remedial wastes prior to land disposal; no loss in protection.						
Region 2 Pepe Field, NJ <i>* Initial cost increase, overall cost decrease.</i>	9/29/89 7/25/97 [ESD]	10/96 6/97	EPA	Soils	Of significant interest to local community. Public notice of final action.	Fed = 30 hrs; Contr. = \$0.1 million Est'd Savings = \$0*
Type of Change: From - landfill containment remedy; To - stabilization, excavation, and off-site disposal of landfill waste material.						
Factual Basis: In design, cost of containment remedy greatly increased.						
Region 2 Preferred Plating, NY	9/89 9/97 [ROD-A]	7/94 7/97	EPA	Groundwater	Full State involvement; public notice given; public meeting held; community expressed little interest.	Fed = 1,000 hrs; Contr. = \$0 Est'd Savings = \$9.3 million
Type of Change: From - active extraction and treatment; To - monitored natural attenuation.						
Factual Basis: Subsequent sampling identified space restrictions and decline in contaminant concentrations.						

Region Site Name, State	Date of Original ROD Date of Change [ESD/ROD-A]	Date Review Commenced Date Review Completed	Change Initiator	Media	State/ Community Involvement	Est'd Resource Demands - Fed/Contr. Est'd Cost Savings
Region 2 Rowe Industries, NY	9/30/92	12/11/95	PRP	Groundwater, Soil	Significant State and public interest; public notice; public comment period; community provided comment.	Fed = 100 hrs; Contr. = \$0 Est'd Savings = \$0.1 million
	7/97 [ROD-A]	5/16/97				
	Type of Change: From - excavation and off-site disposal of soil; To - excavation, in-situ soil vapor extraction of unsaturated soil, and in-situ air sparging of saturated soil.					
	Factual Basis: Extent of soil contamination greater than originally presumed; new remedy more efficient and cost-effective.					
Region 2 Vineland Chemical, NJ	9/29/89	5/95	EPA, State	Buildings, Groundwater	State concern over cost of remedy.	Fed = 300 hrs; Contr. = \$0.1 million Est'd Savings = \$5 million
	6/30/97 [ESD]	6/97				
	Type of Change: (Groundwater) From - groundwater treatment system; To - downsize treatment system. (Buildings) demolish and dispose of off-site.					
	Factual Basis: Request by State during design to downsize system.					
Region 2 Volney Landfill, NY	7/87	6/97	EPA, PRP	Groundwater	State and public interest.	Fed = 100 hrs; Contr. = \$0 Est'd Savings = \$15 million
	8/97 [ESD]	8/97				
	Type of Change: From - install slurry wall and expand leachate collection system; To - no slurry wall; intermittent extract and treat in combination with existing leachate collection system.					
	Factual Basis: Results of pre-design studies conclude that expansion of the leachate collection system is not appropriate, a slurry wall is not cost-effective, and the off-site treatment and disposal of leachate is more cost-effective than on-site treatment and disposal.					

Region Site Name, State	Date of <u>Original ROD</u> Date of Change [ESD/ROD-A]	Date Review <u>Commenced</u> Date Review Completed	Change Initiator	Media	State/ Community Involvement	Est'd Resource Demands - <u>Fed/Contr.</u> Est'd Cost Savings
Region 2 - FY96						
Region 2 A.O. Polymer, NJ	6/28/91 9/17/96 [ESD]	3/9/95 9/17/96	PRP	Groundwater	State involved in PRP negotiations and meetings; public notified; community concerns were identified and considered; State concurred with remedy change.	Fed = 400 hrs; Contr. = \$0 Est'd Savings = \$9.6 million
Type of Change: From - powdered activated carbon treatment (PACT) system; To - air stripping, and From - discharge of treated groundwater to recharge basins; To - discharge to Wallkill River.						
Factual Basis: PACT failed treatability study testing; additional modeling reduced capture zone; change reduces chance of flooding neighboring areas.						
Region 3 - FY97						
Region 3 Avco Lycoming, PA	6/28/91 12/30/96 [ROD-A]	5/15/95 6/15/96	PRP	Groundwater	State was involved in review and concurred; public notified, public meeting held; community was receptive to change.	Fed = 1000 hrs; Contr. = \$4.2 million ¹ Est'd Savings = \$5.3 million
Type of Change: From - groundwater pump and treat; To - in-situ groundwater treatment using molasses injection for metals treatment and air sparging/soil vapor extraction for organics treatment.						
Factual Basis: Pilot tests were successful, cleanup time would be reduced by thirty-three percent.						

¹ Extensive Federal hours and contractor dollars needed to review and analyze remedy performance.

Region Site Name, State	Date of Original ROD Date of Change [ESD/ROD-A]	Date Review Commenced Date Review Completed	Change Initiator	Media	State/ Community Involvement	Est'd Resource Demands - Fed/Contr. Est'd Cost Savings
Region 3 Brodhead Creek OU1, PA	3/29/91 7/19/94 [ESD] 9/30/97 [ESD]	6/7/96 7/25/96 9/28/97	PRP	Soil, Groundwater	State concurred; public notified.	Fed = 75 hrs; Contr. = \$0 Est'd Savings = \$87,000
Type of Change: (Soil) From - interim remedy for OU1; To - final remedy for OU1. (Groundwater) From - Contained Recovery of Oil Waste (CROW) process; To - intermittent pumping for CROW in subsurface when pockets of contamination exist.						
Factual Basis: Revised estimate of total surface area of coal tar accumulation, and determination that interim actions addressed site risks.						
Region 3 Browns Battery, PA	7/92 1/27/97 [ESD]	6/96 1/27/97	Comm.	Soil	State concurred; public notification; public comment period; community opposition to original treatment location.	Fed = 50 hrs; Contr. = \$0 Est'd Savings = no net savings
Type of Change: From - remove PRP's home facility as only thermal treatment location; To - any permitted hazardous waste toxic substance disposal facility.						
Factual Basis: Community opposed original treatment location.						
Region 3 Croydon TCE, PA	6/29/90 12/31/96 [ESD]	3/93 12/31/96	EPA	Groundwater	State concurred; public notice given; posted in Federal Register.	Fed = 1000 hrs ² ; Contr. = \$0 Est'd Savings = \$1 million
Type of Change: From - treating two plumes; To - treat one plume.						
Factual Basis: PRP was found for one of the plumes and it will be addressed under RCRA.						

² Multiple meetings with PRPs on the proposal; extensive data review - hydrogeological and historical.

Region Site Name, State	Date of Original ROD Date of Change [ESD/ROD-A]	Date Review Commenced Date Review Completed	Change Initiator	Media	State/ Community Involvement	Est'd Resource Demands - Fed/Contr. Est'd Cost Savings
Region 3 Industrial Lane, PA	3/29/91	11/15/95	PRP	Debris	State concurred.	Fed = 120 hrs; Contr. = \$0
	12/5/96 [ESD]	11/26/96				Est'd Savings = \$2.4 million
	Type of Change: From - soil cap and groundwater pump and treat; To - change cap design and change groundwater discharge and From - background-based; To - MCL/health-based standards for groundwater.					
Region 3 Mill Creek Dump, PA	5/7/86	11/96	PRP	Surface soils	State involved in review; public comment period.	Fed = 26 hrs; Contr. = \$0
	4/30/97 [ESD]	4/30/97				Est'd Savings = no net savings
	Type of Change: From - land use identified in ROD; To - build driving range for land reuse.					
Region 3 Paoli Rail Yard, PA <i>* Initial cost increase, overall cost decrease.</i>	9/30/92	7/97	PRP	Residuals, Sludge, Surface water, Structures	State and community concurred.	Fed = 68 hrs; Contr. = \$0
	3/30/97 [ESD]	9/97				Est'd Savings = savings over time; not estimated*
	Type of Change: From - decontamination of on-site buildings; To - decontamination and demolition of on-site buildings.					
	Factual Basis: Change in Applicable or Relevant and Appropriate Requirements (ARARs) (PA eliminated requirement for cleaning up groundwater to background levels).					
	Factual Basis: Other than reform; changed intended land use.					
	Factual Basis: Community requested demolition of building, savings over time regarding operation and maintenance.					

Region Site Name, State	Date of Original ROD Date of Change [ESD/ROD-A]	Date Review Commenced Date Review Completed	Change Initiator	Media	State/ Community Involvement	Est'd Resource Demands - Fed/Contr. Est'd Cost Savings
Region 3 Recticon/Allied Steel, PA	6/93	12/95	PRP, State	Soil, Groundwater	State concurred; public notified; public comment period; public meeting. Comments addressed in Responsiveness Summary.	Fed = 140 hrs; Cont. = \$0
	8/29/97 [ROD-A]	8/29/97				Est'd Savings = \$40,000
	Type of Change: (Soil) From - excavate and off-site disposal of soils; To - no disposal needed, but institutional controls to limit future use. (Groundwater) From - extract and treat and dispose to surface water; To - performance standard will be MCLs.					
Factual Basis: PA background requirements were used for original ROD (ARAR change).						
Region 3 Revere Chemical, PA	12/27/93	12/11/95	PRP	Soil	State concurred; several residents attended public availability sessions.	Fed = 265 hrs; Contr. = \$0
	3/25/97 [ESD]	3/25/97				Est'd Savings = \$0.2 million
	Type of Change: From - in-situ vacuum extraction for soil cleaning; To - ex-situ vacuum extraction, and From - slurry wall to prevent spread of contaminants; To - no slurry wall, and From - size of cap determined by Drinking Water Method Detection Limits; To - size of cap determined by MCLs.					
Factual Basis: Poor performance pilot test of ROD remedy and decrease in volume of VOC-contaminated soil.						
Region 3 Tonolli Corp., PA	9/30/92	10/17/96	EPA	Closure of On- Site hazardous waste landfill	State did not concur on ESD.	Fed = 46 hrs; Contr. = \$0
	1/7/97 [ESD]	1/17/97				Est'd Savings = \$50,000
	Type of Change: From - evaluation of artificial groundwater dewatering system; To - no evaluation.					
Factual Basis: Results of hydrogeological study; granted waiver of State ARARs due to equivalent standard of performance already being met.						

Region Site Name, State	Date of <u>Original ROD</u> Date of Change [ESD/ROD-A]	Date Review <u>Commenced</u> Date Review Completed	Change Initiator	Media	State/ Community Involvement	Est'd Resource Demands - <u>Fed/Contr.</u> Est'd Cost Savings	
Region 3 West Virginia Ordnance Works, WV	9/30/88	2/17/94	Fed. Fac.	Groundwater, Surface water	Mason County involved in ESD.	Fed = not available Contr. = not available	
	2/27/97 [ESD]	4/3/94				Est'd Savings = not available	
	Type of Change: From - discharge of pump and treat system into Ohio River; To - adjacent creek.						
	Factual Basis: Time savings - discharge to creek could begin immediately.						
Region 3 - FY96							
Region 3 Abex Corp., VA	9/29/92	10/30/92	PRP	Soil	Received State review and comment; public availability sessions.	Fed = 300 hrs; Contr. = \$0	
	10/5/95 [ESD]	3/28/94				Est'd Savings = \$1 million	
	Type of Change: From - excavation of all soil in two-block area; To - excavation of only uncovered soil.						
	Factual Basis: City rezoned some of residential area for commercial/industrial use.						
Region 3 Bendix, PA	9/30/88	6/1/95	EPA, PRP	Soil	State concurred; notice of ESD published; ESD placed in Administrative Record; no comment from community.	Fed = 48 hrs; Contr. = \$5,000	
	11/22/95 [ESD]	11/22/95				Est'd Savings = \$0.1 million	
	Type of Change: From - soil vapor extraction; To - mechanical aeration of soils.						
	Factual Basis: Tight soil density made soil vapor extraction impractical; restricting utilities removed; treatability study results.						

Region Site Name, State	Date of <u>Original ROD</u> Date of Change [ESD/ROD-A]	Date Review <u>Commenced</u> Date Review Completed	Change Initiator	Media	State/ Community Involvement	Est'd Resource Demands - <u>Fed/Contr.</u> Est'd Cost Savings
Region 3 Defense General Supply Center, VA	3/25/92	3/15/93	EPA, State, Fed. Fac.	Air, Groundwater, Soil	Public notice; no negative comments received; State involved in entire process.	Fed = not available; Contr = not available
	3/8/96 [ESD]	9/3/95				Est'd Savings = \$1.5 million
	Type of Change: From - groundwater extraction/treatment system; To - capping.					
Factual Basis: Sampling in design indicated groundwater no longer posed a risk.						
Region 3 Defense General Supply Center, VA	9/29/93	12/5/93	EPA, State, Fed. Fac.	Groundwater	Public comment requested, no comments received; State was partner in all decisions.	Fed = not available; Contr = not available
	3/8/96 [ESD]	9/15/95				Est'd Savings = \$2,000
	Type of Change: From - ground water treatment ; To - different discharge location of treated groundwater.					
Factual Basis: Field testing in design.						
Region 3 Delta Quarries/Stotler Landfill, PA	3/29/91	9/95	PRP	Groundwater	State concurred; public notification; public meeting.	Fed = 26 hrs; Contr. = \$0
	12/6/95 [ESD]	12/95				Est'd Savings = \$0.3 million
	Type of Change: From - on-site treatment using air stripping; To - more reliable off-site treatment.					
Factual Basis: PRP investigation during design determined that change from onsite to offsite treatment of groundwater was protective of human health and the environment.						

Region Site Name, State	Date of Original ROD Date of Change [ESD/ROD-A]	Date Review Commenced Date Review Completed	Change Initiator	Media	State/ Community Involvement	Est'd Resource Demands - Fed/Contr. Est'd Cost Savings
Region 3 Fike/Artel, WV	3/31/92	4/94	PRP	Air, Surface water	Periodic meetings; press releases; and newspaper ads.	Fed = 1742 hrs ³ ; Contr. = \$0
	1/30/96 [ESD]	1/30/96				Est'd Savings = \$4.8 million
	Type of Change: From - dome-enclosed excavation; To - open air excavation, and From - on-site treatment of surface water in deteriorating plant; To - treatment in newly built plant.					
	Factual Basis: Improved safety, increased cost savings.					
Region 3 NCR, DE	8/12/91	10/17/94	PRP	Groundwater	Initial and follow-up fact sheets provided to community; State concurred with revised remedy.	Fed = 811 hrs; Contr. = \$0
	3/27/96 [ESD]	3/27/96				Est'd Savings = \$2.5 million
	Type of Change: From - pump and treat groundwater through air stripper; To - air sparging/soil vapor extraction.					
	Factual Basis: Reduced remediation time by using in-situ treatment.					
Region 3 Old City of York Landfill, PA	9/30/91	7/25/96	PRP	Groundwater, Sediment	State concurred. ESD placed in Administrative Record for public review.	Fed = 40 hrs; Contr. = \$0
	9/27/96 [ESD]	9/27/96				Est'd Savings = not available
	Type of Change: From - stabilization and off-site disposal of sediments; To - capping, and From - background performance standards; To - achieving MCLs.					
	Factual Basis: Analytical testing showed on-site placement was appropriate; change in State ARARs.					

³ Extensive data review, especially for design and cost of new treatment plant; multiple document reviews needed; and multiple meetings with interested parties.

Region Site Name, State	Date of Original ROD Date of Change [ESD/ROD-A]	Date Review Commenced Date Review Completed	Change Initiator	Media	State/ Community Involvement	Est'd Resource Demands - Fed/Contr. Est'd Cost Savings
Region 3 Rentokil, Inc., VA	6/22/93	8/30/95	PRP	Soil	State concurred; proposed plan released to public; public notice published; public meeting held; comments addressed; county interested in site redevelopment.	Fed = 320 hrs; Contr. = \$0
	8/27/96 [ROD-A]	11/13/95				Est'd Savings = \$10 million
	Type of Change: From - low temperature thermal desorption of “hot spot” soil; To - delete “hot spot” treatment; add cap and slurry wall.					
Factual Basis: Modeling indicated that “hot spot” treatment had no impact on groundwater contamination.						
Region 3 Saegertown Industrial Area, PA	1/29/93	2/1/96	PRP	Sludge, Soil	State and community were informed of proposal.	Fed = 160 hrs; Contr. = \$0
	3/1/96 [ESD]	3/1/96				Est'd Savings = \$4.6 million
	Type of Change: From - off-site thermal treatment; To - expanded off-site thermal treatment facilities to include large coal-fired cyclone power generating boilers.					
Factual Basis: EPA approval of alternate thermal treatment.						
Region 3 Saunders Supply Company, VA	9/30/91	12/8/95	EPA	Soil	State concurred; proposed plan made available; public meeting held and comments addressed.	Fed = 224 hrs; Contr. = \$0
	9/27/96 [ROD-A]	3/21/96				Est'd Savings = \$0.7 million
	Type of Change: From - on-site thermal desorption; To - off-site incineration.					
Factual Basis: New VDEQ (Virginia) regulations on backfilling - more cost-effective and improved short-term effects.						

Region Site Name, State	Date of <u>Original ROD</u> Date of Change [ESD/ROD-A]	Date Review <u>Commenced</u> Date Review Completed	Change Initiator	Media	State/ Community Involvement	Est'd Resource Demands - <u>Fed/Contr.</u> Est'd Cost Savings
Region 3 Tyson's Dump, PA	3/31/88 7/26/96 [ROD-A]	11/15/94 7/26/96	PRP	Soil	State concurred; involved during remedial design/remedial action; public comment period held by EPA; community is content with change.	Fed = 1000 hrs; Contr. = \$300,000 ⁴ Est'd Savings = \$8 million
Type of Change: From - soil vacuum extraction; To - covering lagoons with wet soil cover.						
Factual Basis: Original remedy could not achieve cleanup levels set forth in ROD.						
Region 3 Whitmoyer Labs, PA	12/17/90 11/7/95 [ESD]	6/7/95 11/7/95	PRP	Debris, Solid Waste	State concurred with ESD; public notified; public meeting held; public strongly supported modification.	Fed = 100 hrs; Contr. = \$0 Est'd Savings = \$7 million
Type of Change: From - on-site incineration and fixation; To - off-site incineration and fixation.						
Factual Basis: Technology remained the same - only the location was modified; community preference.						
Region 3 William Dick Lagoons, PA	3/31/93 12/8/95 [ESD]	5/18/93 7/6/95	PRP	Soil	Public notice; ESD placed in Administrative Record; State concurred.	Fed = 170 hrs; Contr. = \$0 Est'd Savings = \$5.8 million
Type of Change: From - excavation and on-site thermal desorption for all soil; To - soil vapor extraction/bioremediation treatment for soil under lagoon.						
Factual Basis: Found the use of in-situ treatment cost-effective based on pilot study results without changing the cleanup standards.						

⁴ Multiple reviews of the ROD and supporting data; multiple meetings with interested parties; and additional enforcement time needed.

Region Site Name, State	Date of <u>Original ROD</u> Date of Change [ESD/ROD-A]	Date Review <u>Commenced</u> Date Review Completed	Change Initiator	Media	State/ Community Involvement	Est'd Resource Demands - <u>Fed/Contr.</u> Est'd Cost Savings
Region 4 - FY97						
Region 4 Aberdeen Pesticide Dump Site - Farm Chemicals Twin Sites, and Fairway Six Areas - (OU3), NC	10/7/93 9/15/97 [ESD]	5/97 7/3/97	PRP	Groundwater	State and community received proposed fact sheet and attended public meeting.	Fed = 180 hrs; Contr. = \$2,000 Est'd Savings = TBD
Type of Change: From - thermal destruction in air stripper; To - carbon filtration and phytoremediation.						
Factual Basis: Additional data in RA changes groundwater approach.						
Region 4 Arlington Blending, TN	6/91 7/24/97 [ROD-A]	8/96 7/24/97	EPA, PRP	Groundwater	State concurred; EPA convened public meeting and received no written comments.	Fed = 240 hrs; Contr. = \$0 Est'd Savings = \$5.5 million
Type of Change: From - groundwater pump and treat; To - monitored natural attenuation.						
Factual Basis: Sampling indicated drinking water aquifer not contaminated as originally presumed.						
Region 4 By Pass 601, NC (OU 2)	4/20/93 4/18/97 [ROD-A]	1/15/96 4/18/97	PRP	Groundwater, Soil	State and community concurred; State is major PRP.	Fed = 400 hrs; Contr. = \$0 Est'd Savings = \$28 million
Type of Change: From - stabilization/solidification of all soil; groundwater pump and treat; To - stabilization/solidification of reduced volume of soil and groundwater monitoring.						
Factual Basis: Reduced volume of soil contamination and the use of alternate concentration levels for ground water.						

Region Site Name, State	Date of Original ROD Date of Change [ESD/ROD-A]	Date Review Commenced Date Review Completed	Change Initiator	Media	State/ Community Involvement	Est'd Resource Demands - Fed/Contr. Est'd Cost Savings
Region 4 Diamond Shamrock Landfill/Cedartown, GA	5/12/94	8/15/96	PRP	Groundwater	State involved and approved of change. Public was notified by fact sheet.	Fed = 220 hrs; Contr. = \$0 Est'd Savings = unknown
	9/15/97 [ESD]	8/15/97				
	Type of Change: Change in performance goals for manganese from 200 mg/l to 850 mg/l.					
	Factual Basis: Change in reference dose for manganese.					
Region 4 Homestead Air Force Base, FL (OU 6)	6/27/95	9/17/97	Fed. Fac.	Groundwater, Soil	Input from Restoration Advisory Board; conducted public meetings and public agrees with change; published in local newspaper.	Fed = 10 hrs; Contr. = \$0 Est'd Savings = \$0.1 million
	10/22/97 [ESD]	10/22/97				
	Type of Change: From - thermal treatment on-site of soil; To - off-site disposal of soil; groundwater system recovered less LNAPL than previously anticipated.					
	Factual Basis: Data in design showed reduced volume of soil.					
Region 4 Marzone Inc./Chevron Chemical Co., GA	9/30/94	3/15/97	EPA	Soil	EPA addressed community and ATSDR concerns. Proposed plan fact sheet issued to public and State. State concurred.	Fed = 80 hrs; Contr. = \$0 Est'd Savings = \$2.8 million
	6/18/97 [ROD-A]	6/18/97				
	Type of Change: From - low temperature thermal desorption; To - off-site landfill disposal.					
	Factual Basis: Community opposed to thermal treatment and discovery of dioxin during remedial design.					
Region 4 Munisport Landfill, FL	7/17/90	9/4/95	EPA	Groundwater, Surface water	State and county briefed and concurred with change; proposed plan fact sheet issued and there were three public meetings; community activists oppose change.	Fed = 2,000 hrs; Contr. = \$0.2 million Est'd Savings = \$0.1 million
	9/5/97 [ROD-A]	9/5/97				
	Type of Change: From - tidal restoration of wetland and groundwater pump and treat for containment; To - groundwater pump and treat not needed to create hydraulic barrier.					

Region Site Name, State	Date of Original ROD Date of Change [ESD/ROD-A]	Date Review Commenced Date Review Completed	Change Initiator	Media	State/ Community Involvement	Est'd Resource Demands - Fed/Contr. Est'd Cost Savings
Factual Basis: Response actions to date have met objectives in original ROD.						
Region 4 NAS Pensacola (OU12), FL	7/31/95 9/2/97 [ESD]	10/96 9/2/97	Fed. Fac.	Groundwater	Public was notified about the change.	Fed = 8 hrs; Contr. = \$0 Est'd Savings = \$5,000
Type of Change: From - remedy included 5-yr. review requirement; To - remove 5-yr. requirement.						
Factual Basis: Re-evaluated risk assessment and found the detected arsenic levels were below the Federal and State drinking water standards.						
Region 4 National Starch, NC	10/93 6/10/97 [ESD]	3/97 6/10/97	PRP	Soil	State review and concurrence; public was notified.	Fed = 15 hrs; Contr. = \$0 Est'd Savings = negligible
Type of Change: From - off-site disposal of well drilling cuttings; To - on-site treatment by thermal desorber and on-site disposal.						
Factual Basis: Elevated levels of contaminants in soil cuttings required treatment prior to disposal.						
Region 4 Reeves Southeastern, FL	10/13/92 4/17/97 [ESD]	2/27/97 4/17/97	PRP	Soil	Public comment period; no significant issues raised by public/State.	Fed = 50 hrs; Contr. = \$5,000 Est'd Savings = \$0.2 million
Type of Change: From - on-site solidification/stabilization and containment; To - off-site containment.						
Factual Basis: Original remedy could not meet performance standards.						

Region Site Name, State	Date of <u>Original ROD</u> Date of Change [ESD/ROD-A]	Date Review <u>Commenced</u> Date Review Completed	Change Initiator	Media	State/ Community Involvement	Est'd Resource Demands - <u>Fed/Contr.</u> Est'd Cost Savings
Region 4 Savannah River Plant, (OU21, 29), SC	1/9/94 5/14/97 [ESD]	5/16/97 5/27/97	Fed. Fac.	Groundwater	State approved ESD. Public notice of ESD to be placed in Administrative Record.	Fed = 6 hrs; Contr. =- \$0 Est'd Savings = \$0.1 million
Type of Change: From - groundwater treatment with recirculation well of part of treatment plan; To - remove recirculation well from treatment plan.						
Factual Basis: Testing in RA demonstrated that the recirculation well was not effective.						
Region 4 - FY96						
Region 4 Aberdeen Pesticide Dumps Site, NC	9/30/91 3/96 [ESD]	8/19/94 2/13/95	PRP	Soil	The State was involved in the decision. The ESD notice was published in the local newspaper, however, a public meeting was not held.	Fed = 120 hrs Contr. = Est'd Savings = None
Type of Change: From - arsenic performance standard of 1 ppm; To - arsenic performance standard of 30 ppm.						
Factual Basis: Revisions to the arsenic cancer slope factor and changes in the bioavailability factor.						
Region 4 Cape Fear Wood Preserving, NC	8/95 9/96 [ESD]	4/96 6/96	EPA	Soil	State review and concurrence; public notified; ESD placed in Administrative Record.	Fed = 20 hrs; Contr. = \$0 Est'd Savings = None
Type of Change: From - soil washing, biotreatment, and solidification; To -low temp. thermal desorption and solidification.						
Factual Basis: Cleanup goals could be reached without bioremediation step. Also, soil washing did not achieve cleanup goals.						

Region Site Name, State	Date of <u>Original ROD</u> Date of Change [ESD/ROD-A]	Date Review <u>Commenced</u> Date Review Completed	Change Initiator	Media	State/ Community Involvement	Est'd Resource Demands - <u>Fed/Contr.</u> Est'd Cost Savings
Region 4 Cedartown Municipal Landfill, GA	11/2/93	5/22/96	EPA	Leachate	Reviewed draft ESD.	Fed = 10 hrs Contr. = \$0
	6/3/96 [ESD]	6/3/96				Est'd Savings = None
	Type of Change: Changed groundwater performance standard for manganese based on reviewed reference dose.					
Factual Basis: Revised reference dose for manganese.						
Region 4 Harris Corp., FL	2/15/95	4/95	PRP, State	Groundwater	State involved throughout review; public notified; community provided with fact sheets; no comments received.	Fed = 320 hrs; Contr. = \$1,500
	12/8/95 [ESD]	12/95				Est'd Savings = \$0.1 million
	Type of Change: From - treatment of manganese; To - only monitoring of manganese; also deleted 2 contaminants of concern.					
Factual Basis: Sampling data in design showed contaminants to be below cleanup levels.						
Region 4 Hipps Road Landfill, FL	9/30/86	1/1/96	EPA	Groundwater	State and community not involved in change.	Fed = 60 hrs; Contr. = \$0
	6/1/96 [ESD]	4/1/96				Est'd Savings =min.
	Type of Change: From - discharge to holding pond; To - alternate discharge to POTW when holding pond reaches capacity.					
Factual Basis: Successful discussion with publically-owned treatment works (POTW) allows for alternate discharge location.						
Region 4 ILCO (Interstate Lead Company) Leads, AL	10/13/94	2/96	EPA	Solid waste	State and community preference for off-site disposal led to change.	Fed = 450 hrs; Contr. = \$0
	8/27/96 [ROD-A]	8/27/96				Est'd Savings = \$15 million
	Type of Change: From - acid leaching with a contingency for on-site disposal; To - off-site disposal without acid leaching.					
Factual Basis: Treatability study results show acid leaching was not effective on all site soils.						

Region Site Name, State	Date of Original ROD Date of Change [ESD/ROD-A]	Date Review Commenced Date Review Completed	Change Initiator	Media	State/ Community Involvement	Est'd Resource Demands - Fed/Contr. Est'd Cost Savings
Region 4 JFD Electronics/Channel Master, NC	9/10/92	4/95	PRP	Groundwater	State concurred with ESD; public was notified.	Fed = 120 hrs; Contr. = \$0
	1/24/96 [ESD]	1/24/96				Est'd Savings = \$3 million
	Type of Change: From - treatment and disposal; To - air stripping.					
	Factual Basis: Remedial design information indicated air stripping was sufficient.					
Region 4 Marzone Inc./Chevron Chemical Co., GA	9/30/94	8/12/96	EPA, PRP	Soil	State reviewed draft ESD. No comments received. Fact sheet issued to public, but no comments received on temperature change.	Fed = 10 hrs; Contr. = \$0
	9/12/96 [ESD]	9/12/96				Est'd Savings = \$0.5 million
	Type of Change: Changed operating temperature of thermal desorber unit.					
	Factual Basis: Lower temperature more efficient at treating soils.					
Region 4 Mathis Brothers/South Marble Top Road Landfill, GA	3/24/93	7/12/95	PRP	Debris, Liquid waste, Soil, Groundwater	Proposed plan fact sheet issued. State and community concurred.	Fed = 400 hrs; Contr. = \$50,000
	9/27/96 [ROD-A]	8/15/96				Est'd Savings = \$5 million
	Type of Change: From - on-site treatment; To - off-site treatment.					
	Factual Basis: Studies in design indicated volume smaller than in original ROD.					
Region 4 Potter's Septic Tank, NC	8/5/92	11/95	State	Soil	Community provided with fact sheets; newspaper notices; State concurred.	Fed = 120 hrs; Contr. = \$0
	2/6/96 [ROD-A]	2/6/96				Est'd Savings = \$0.8 million
	Type of Change: From - lead soil excavation target of 25 ppm; To - lead soil excavation target of 400 ppm.					
	Factual Basis: Revised leachate model for lead cleanup goal in soil for protection of groundwater based on new modeling of effect on groundwater.					

Region Site Name, State	Date of Original ROD Date of Change [ESD/ROD-A]	Date Review Commenced Date Review Completed	Change Initiator	Media	State/ Community Involvement	Est'd Resource Demands - Fed/Contr. Est'd Cost Savings
Region 5 - FY97						
Region 5 Allied Chemical/Ironton Coke, OH	12/28/90 9/4/97 [ROD-A #2]	8/23/96 2/26/97	PRP	Soil	State concurred; public notified; public comment period; no comments received.	Fed = 80 hrs; Contr. = \$0 Est'd Savings = \$2.2 million
Type of Change: From - pad bioremediation; To - off-site disposal in subtitle D landfill.						
Factual Basis: Additional sampling in design determined lower levels of contaminants than originally thought, classifying soils as non-hazardous.						
Region 5 Arcanum Iron and Metal, OH	9/6/86 6/18/97 [ROD-A]	9/15/89 2/28/97	EPA	Soil, Solid Waste, Groundwater	Public notice; public meeting held; comments summarized in Responsiveness Summary; State concurred with change.	Fed = 500 hrs; Contr. = \$100,000 Est'd Savings = \$14 million
Type of Change: From - off-site disposal of waste with lead (Pb) concentrations >500 ppm; To - off-site disposal of waste with lead (Pb) concentrations >1500 ppm.						
Factual Basis: Revision of lead cleanup standards and redefining of land use from residential to industrial.						
Region 5 Buckeye Reclamation Landfill, OH	8/19/91 7/17/97 [ESD]	3/7/95 5/97	PRP	Groundwater, Solid Waste, Leachate	Fact sheets sent to community; State involvement throughout. State concurred.	Fed = 3000 hrs ⁵ ; Contr. = \$20,000 Est'd Savings = \$25.2 million
Type of Change: From - solid waste containment; To - "less, but still appropriate, containment," and From - groundwater/leachate treatment; To - monitoring for possible future treatment.						
Factual Basis: Historical review of area resulted in change of standard to 1976 Ohio solid waste capping requirements.						

⁵ Intensive review effort that took over two years; additional field work was conducted; extended negotiation period occurred; and multiple documents reviewed.

Region Site Name, State	Date of <u>Original ROD</u> Date of Change [ESD/ROD-A]	Date Review <u>Commenced</u> Date Review Completed	Change Initiator	Media	State/ Community Involvement	Est'd Resource Demands - <u>Fed/Contr.</u> Est'd Cost Savings
Region 5 City Disposal Corp. Landfill, WI	9/28/92	9/12/96	EPA, PRP, State	Groundwater	State concurred; public notified; fact sheets issued; public meetings held for community.	Fed = 160 hrs; Contr. = \$6,000
	6/11/97 [ESD]	6/11/97				Est'd Savings = not available
	Type of Change: From - on-site groundwater extract and treat; To - allow removal and off-site treatment while monitoring content to develop long-term remediation effort.					
Factual Basis: Based on treatability study results.						
Region 5 Clare Water Supply, MI	9/16/92	4/26/96	PRP	Soil	Public notice given; public comment period; public meeting held; State and community support.	Fed = 90 hrs; Contr. = \$0
	5/15/97 [ROD-A]	7/1/96				Est'd Savings = \$2 million
	Type of Change: From - in-situ vapor extraction; To - containment and capping.					
Factual Basis: In-situ vapor extraction ineffective due to soil impermeability to air.						
Region 5 Enviro-Chem, IN	9/25/87	1/93	PRP	Groundwater, Soil	State concurrence; public notified; public comment period; no comments received.	Fed = 400 hrs; Contr. = \$30,000
	7/14/97 [ESD]	3/11/96				Est'd Savings = not available
	Type of Change: From - soil vapor extraction; To - soil excavation and addition of three new compounds, installation of cap, extension of remediation boundary.					
Factual Basis: Additional technical and toxicological information, including identification of nine additional organic compounds, discovery of higher water tables, and change to organic carbon content modeling.						

Region Site Name, State	Date of Original ROD Date of Change [ESD/ROD-A]	Date Review Commenced Date Review Completed	Change Initiator	Media	State/ Community Involvement	Est'd Resource Demands - Fed/Contr. Est'd Cost Savings
Region 5 Fields Brook Superfund Site, OH	9/30/86	9/96	PRP	Sediment	State commented; State did not concur with the change. Public notified; public meeting.	Fed = 250 hrs; Contr. = \$0 Est'd Savings = \$20 million
	8/15/97 [ESD]	4/20/97				
	Type of Change: From - solidification and on-site thermal treatment; To - on-site landfill and off-site thermal treatment.					
	Factual Basis: Additional data in design refines cleanup goal, showed reduced volumes of sediment contamination, and documents waiver of TSCA landfill requirement.					
Region 5 Fisher-Calo, IN	8/7/90	8/15/96	EPA, PRP	Soil	State concurred with change; community involved in public meeting and comment period.	Fed = 300 hrs; Contr. = \$20,000 Est'd Savings = \$6 million
	9/26/97 [ROD-A]	9/23/97				
	Type of Change: From - incineration of soils; To - air sparging bioremediation for SVOC-soils and off-site disposal of PCB-soils.					
	Factual Basis: Sampling results in design showed reduced volumes of contamination.					
Region 5 Janesville Ash Beds and Janesville Old Landfill, WI	12/29/89	1/30/95	PRP	Groundwater	State reviewed and concurred with change. Public comment period; no comments from community, only PRP and State commented.	Fed = 100 hrs; Contr. = \$0 Est'd Savings = \$1.4 million
	9/17/97 [ESD]	7/30/97				
	Type of Change: From - groundwater extract and treat; To - monitored natural attenuation.					
	Factual Basis: Groundwater monitoring data shows decrease in VOC concentrations.					

Region Site Name, State	Date of <u>Original ROD</u> Date of Change [ESD/ROD-A]	Date Review <u>Commenced</u> Date Review Completed	Change Initiator	Media	State/ Community Involvement	Est'd Resource Demands - <u>Fed/Contr.</u> Est'd Cost Savings
Region 5 Moss-American, WI	9/27/90 4/29/97 [ESD]	9/4/96 4/29/97	PRP	Groundwater	Fact sheet distributed to community.	Fed = 160 hrs; Contr. = \$4,000 Est'd Savings = \$70,000
Type of Change: From - extract and treat system; To - in-situ groundwater treatment using a funnel and gate type system.						
Factual Basis: Data gathered in design indicating relatively fine grained soils at the site which gave opportunity for funnel and gate type system; more cost-effective approach.						
Region 5 Ormet, OH	9/12/94 4/1/97 [ESD]	8/27/96 3/31/97	PRP	Sediment, Soil	Public notice in newspaper; State did not concur with changes or ROD.	Fed = 140 hrs; Contr. = N/A Est'd Savings = \$1 million
Type of Change: From: soil removal and off-site disposal; To - on-site disposal in a Toxic Substance Control Act (TSCA) compliant cell.						
Factual Basis: Pre-design studies and same type of disposal cell to be constructed on-site.						
Region 5 Peerless Plating, MI	9/21/92 8/4/97 [ESD]	12/30/96 3/30/97	EPA	Soil	State concurred; public notice in local paper.	Fed = 75 hrs; Contr. = \$3,000 Est'd Savings = \$1.9 million
Type of Change: From - extraction and off-site disposal; To - decreased soil remediation levels and volume to be extracted.						
Factual Basis: New pre-design phase data, new MDEQs (Michigan) standards.						

Region Site Name, State	Date of Original ROD Date of Change [ESD/ROD-A]	Date Review Commenced Date Review Completed	Change Initiator	Media	State/ Community Involvement	Est'd Resource Demands - Fed/Contr. Est'd Cost Savings
Region 5 Powell Road Landfill, OH	10/30/93 1/97 [ESD]	5/14/96 1/97	PRP	Groundwater	Fact sheet issued; public meeting; and public comment period held; State concurred with ESD.	Fed = 200 hrs; Contr. = \$8,000 Est'd Savings = \$8.4 million
	Type of Change: From - groundwater extract and treat with source control measures (cap and leachate collection); To - postponing of groundwater pump and treat system until all other remedial actions are set up.					
	Factual Basis: Pending study, cap, landfill leachate, and gas collection may have significant effect on groundwater.					
Region 5 Powell Road Landfill, OH	10/30/93 8/13/97 [ESD]	11/96 5/97	PRP	Leachate	State concurred with change; fact sheet and public notice in local newspaper for change.	Fed = 100 hrs; Contr. = \$2,000 Est'd Savings = \$1.6 million
	Type of Change: From - on-site leachate treatment facility; To - discharge to municipal POTW for treatment.					
	Factual Basis: In design, PRPs investigated this possibility; no loss in protection.					
Region 5 Reilly Tar & Chemical, MN	6/30/95 3/26/97 [ESD]	7/15/96 10/15/96	EPA, State, PRP	Groundwater	Public notice.	Fed = 80 hrs; Contr. = \$0 Est'd Savings = \$0.5 million
	Type of Change: From - use of newly constructed extraction well for containment; To - use of existing well for containment.					
	Factual Basis: New well can't capture plume, subsequently old well more effective treatment.					
Region 5 United Scrap Lead, OH	9/16/88 6/27/97 [ROD-A]	6/30/92 12/15/96	EPA, PRP	Soil, Solid Waste, Groundwater	Public notice; public meeting held; State concurred with change.	Fed = 500 hrs; Contr. = \$100,000 Est'd Savings = \$54 million
	Type of Change: From - soil/solid waste treatment; To - off-site disposal of soils with lead concentrations above 1,550 ppm and containment of soil below 1,550 ppm.					
	Factual Basis: Revision of lead cleanup standards and redefining of land use from residential to industrial.					

Region Site Name, State	Date of Original ROD Date of Change [ESD/ROD-A]	Date Review Commenced Date Review Completed	Change Initiator	Media	State/ Community Involvement	Est'd Resource Demands - Fed/Contr. Est'd Cost Savings
Region 5 - FY96						
Region 5 Cannelton Industries, MI	9/30/92 9/27/96 [ROD-A]	1/15/95 1/15/96	PRP	Sediment, Soil	State concurred with change; proposed plan made available to public; public meeting held; community supportive of change.	Fed = 240 hrs; Contr. = \$100,000 Est'd Savings = \$15 million
Type of Change: From - on-site containment; To - off-site disposal.						
Factual Basis: New data from pre-design investigations showing little groundwater contamination and confirmed minimal leaching and movement of contaminants; community preference; change in State ARARs for land use.						
Region 5 Electrovoice, MI	6/23/92 5/23/96 [ESD]	7/31/95 (phone) or 8/4/95 (written) 8/11/96	PRP	Groundwater, Sludge, Soil	State concurred; fact sheet distributed to community.	Fed = 160 hrs; Contr. = \$25,000 Est'd Savings = \$0.5 million
Type of change: From - perform subsurface volatilization and ventilation system study; To - no need to expand subsurface system due to revised cleanup standards.						
Factual Basis: Treatability study results and change in Michigan environmental law.						
Region 5 Kummer Sanitary Landfill, MN	9/29/90 11/21/95 [ROD-A]	5/24/95 9/14/95	State	Groundwater, Leachate, Soil	State initiated remedy update and wrote ROD-A; proposed plan made available to public; public notified; public comment period included; public meeting held.	Fed = 120 hrs; Contr. = \$3,480 Est'd Savings = \$5.6 million
Type of Change: From - advanced oxidation process (AOP); To - bioremediation and groundwater monitoring.						
Factual Basis: Additional site data shows change of receptors, decrease of contaminants, and technical and feasibility complication of AOP; more cost-effective and reduces waste volume.						

Region Site Name, State	Date of <u>Original ROD</u> Date of Change [ESD/ROD-A]	Date Review <u>Commenced</u> Date Review Completed	Change Initiator	Media	State/ Community Involvement	Est'd Resource Demands - <u>Fed/Contr.</u> Est'd Cost Savings
Region 5 Metamora, MI	9/30/86	4/12/95	PRP, EPA	Residuals, Soil	State and community involved in ROD amendment; Congressional interest in site - EPA responded to several controlled correspondence letters from residents that did not support the change.	Fed = 300 hrs; Contr. = \$200,000 ⁶
	8/28/96 [ROD-A]	4/23/96				Est'd Savings = \$29 million
	Type of change: From - incineration; To - relocation of waste and inclusion (containment) under a landfill cap.					
Factual Basis: Improved understanding of the nature of the soils threat and more cost-effective.						
Region 5 Pristine, Inc., OH	12/31/87	7/11/95	EPA	Groundwater, Surface water	State agreed with waiver of antidegradation requirements. Public notified through newspaper notice; fact sheet distributed.	Fed = 300 hrs; Contr. = \$10,000
	4/24/96 [ESD]	4/9/96				Est'd Savings = \$15 million
	Type of Change: From - compliance with Ohio effluent limitations; To - waived State anti-degradation requirements.					
Factual Basis: Waiver due to information indicating the technical impracticability of chosen technology to meet State requirements.						
Region 5 Sturgis Municipal Field, MI	9/30/91	3/22/96	PRP	Groundwater, Soil	Public comment period; no indication of community interest; State involvement (site became State enforcement lead).	Fed = 30 hrs; Contr. = N/A
	9/10/96 [ROD-A]	9/10/96				Est'd Savings = \$1.8 million
	Type of Change: From - attain groundwater cleanup levels; To - State Federal MCL's, and From - off-site disposal of polyaromatic hydrocarbons (PAH)-contaminated soil; To - eliminate need to address PAH-contaminated soil.					
Factual Basis: New data in pre-design investigation indicated reduced soil contamination levels.						

⁶ Performed intensive oversight of PRPs; conducted and reviewed additional sampling; and coordinated extensively with interested parties.

Region Site Name, State	Date of Original ROD Date of Change [ESD/ROD-A]	Date Review Commenced Date Review Completed	Change Initiator	Media	State/ Community Involvement	Est'd Resource Demands - Fed/Contr. Est'd Cost Savings		
Region 5 Wash King Laundry, MI	3/31/93	11/1/95	EPA, State	Groundwater, Sediment, Soil	Public comment period; fact sheet distributed to community.	Fed = 120 hrs; Contr. = \$0		
	7/1/96 [ESD]	1/1/96				Est'd Savings = \$6.2 million		
	Type of Change: From - removal of trace metallics in groundwater resulting in surface water discharge; To - reinjection of treated groundwater.							
	Factual Basis: Post-ROD sediment content and groundwater modeling results.							
Region 6 - FY97								
Region 6 Bailey Waste Disposal, TX	6/28/88	7/95	PRP	Soil	Public meeting; no public concern expressed; State provided letter of support for change.	Fed = 400 hrs; Contr. = \$0		
	12/16/96 [ROD-A]	12/16/96				Est'd Savings = \$ 5.4 million		
	Type of Change: From - stabilization and capping; To - capping only.							
	Factual Basis: Failure of stabilization in field testing.							
Region 6 Brio Refining, TX	3/31/88	9/1/94	Comm.	Soil	State concurred; extensive community involvement; Community Advisory Group formed by EPA. Public notified; public meeting held; State provided letter of support for change.	Fed = 1000 hrs ⁷ ; Contr. = \$25,000		
	7/2/97 [ROD-A]	7/2/97				Est'd Savings = \$20 million		
	Type of Change: From - on -site incineration of VOCs; To - containment system for VOCs including cap/slurry wall.							
	Factual Basis: Focused feasibility study information showed high escape of fugitive emissions for incineration remedy and costly engineering controls, leading to community preference for containment.							

⁷ Intensive resource effort in responding to Community Advisory Group concerns during remedy development process.

Region Site Name, State	Date of <u>Original ROD</u> Date of Change [ESD/ROD-A]	Date Review <u>Commenced</u> Date Review Completed	Change Initiator	Media	State/ Community Involvement	Est'd Resource Demands - <u>Fed/Contr.</u> Est'd Cost Savings		
Region 6 Cleveland Mill, NM	9/22/93	5/15/97	EPA, PRP, State	Sediment, Soil	EPA held open house and discussed changes with members of community.	Fed = 300 hrs; Contr. = \$0		
	7/11/97 [Other: Action Memorandum]	6/12/97				Est'd Savings = no net savings		
	Type of Change: From - off-site reprocessing and reclamation, disposal of residuals; To - on-site lime neutralization and disposal in limestone cell with multilayer cap.							
	Factual Basis: Poor site conditions (recent heavy rainfall) and lack of reprocessing facility to accept waste.							
Region 6 Crystal Chemical, TX	9/27/90	2/96	PRP	Groundwater	State concurred. Public notified; public comment period - few comments received; public meeting, public open house.	Fed = 1000 hrs ⁸ ; Contr. = \$0		
	3/19/97 [ESD]	3/19/97				Est'd Savings = \$2.8 million		
	Type of Change: From - pump and treat; To - containment with a slurry wall.							
	Factual Basis: Design investigation and evaluation study data and approval of a technical impracticability waiver.							
Region 6 PAB Oil and Chemical Services, LA	9/22/93	12/96	PRP	Sludge, Soil	EPA held open house; no opposition from community; State provided letter of support for change.	Fed = 500 hrs; Contr. = \$0		
	3/12/97 [ESD]	3/12/97				Est'd Savings = \$3 million		
	Type of Change: From - biological treatment and solidification/stabilization; To - solidification/stabilization only.							
	Factual Basis: Revised precision and detection limits of analytical test procedures.							

⁸ Intensive technical review and development of technical impracticability package.

Region Site Name, State	Date of <u>Original ROD</u> Date of Change [ESD/ROD-A]	Date Review <u>Commenced</u> Date Review Completed	Change Initiator	Media	State/ Community Involvement	Est'd Resource Demands - <u>Fed/Contr.</u> Est'd Cost Savings
Region 6 South Cavalcade Street, TX	9/26/88 6/27/97 [ROD-A]	9/27/95 6/27/97	PRP	Soil, Groundwater	State concurred; public notified; public comment period; public meeting; very little community interest.	Fed = 80 hrs; Contr. = \$0 Est'd Savings = \$5.1 million
Type of Change: From - soil washing and treatment; To - concrete cap and containment.						
Factual Basis: Soil washing failed pilot test.						
Region 6 - FY96						
Region 6 Bailey Waste Disposal, TX	6/28/88 2/28/96 [ESD]	7/95 2/28/96	PRP	Soil	Fact sheets provided by EPA to community; State provided letter of support for change.	Fed = 300 hrs; Contr. = \$0 Est'd Savings = \$.9 million
Type of Change: From - relocation, solidification/stabilization, and capping; To - off-site disposal in industrial waste landfill.						
Factual Basis: Improved timeliness of remedy and increased waste stabilization.						
Region 6 Bailey Waste Disposal (Pit-B), TX	6/28/88 5/1/96 [ESD]	7/95 5/1/96	PRP	Soil	Fact sheets provided by EPA to community; State provided letter of support for change.	Fed = 200 hrs; Contr. = \$0 Est'd Savings = no net savings
Type of Change: From - relocation, solidification/stabilization, and capping; To - off-site disposal in industrial waste landfill.						
Factual Basis: Improved timeliness of remedy, technical difficulties in implementing original remedy, and increased waste stabilization.						
Region 6 Oklahoma Refining Company, OK	6/9/92 3/27/96 [ESD]	9/95 3/27/96	EPA	Soil	Public notified; ESD placed in Administrative Record; community concurred. State part of request for remedy change.	Fed = 200 hrs; Contr. = \$0 Est'd Savings = \$1.3 million
Type of Change: From - recycling or landfilling of asphaltic material; To - stabilize material and cap.						
Factual Basis: New information during value engineering study.						

Region Site Name, State	Date of Original ROD Date of Change [ESD/ROD-A]	Date Review Commenced Date Review Completed	Change Initiator	Media	State/ Community Involvement	Est'd Resource Demands - Fed/Contr. Est'd Cost Savings
Region 6 Vertac, Inc., AR	9/27/90	10/95	EPA	Soil	Numerous public meetings; State provided letter of support for change.	Fed = 80 hrs; Contr. = \$0
	9/17/96 [ROD-A]	9/17/96				Est'd Savings = \$3 million*
	Type of Change: From - on-site incineration of soils with >260 ppb TCDD; To - landfilling all soils contaminated >5 ppb.					
Factual Basis: Community preference. *Cost Savings: From - Proposed Plan; to - ROD-A.						
Region 7 - FY97						
Region 7 Cornhusker Army Ammunition Plant, NE	9/24/94	9/96	U.S. Army	Groundwater, Surface Water	Public comment period; public meetings.	Fed = 50 hrs; Contr. = \$0
	2/7/97 [ESD]	2/97				Est'd Savings = \$6 million
	Type of Change: From - discharge point to Platte River; To - discharge point to on-site drainage ditch.					
Factual Basis: Public concerns regarding impact to groundwater and migration of contaminants offsite.						
Region 7 McGraw Edison, IA	9/93	4/25/97	PRP	Groundwater	State review and verbal concurrence.	Fed = 25 hrs; Contr. = \$0
	9/97 [Letter]	9/17/97				Est'd Savings = \$0.2 million
	Type of Change: From - groundwater extract and treat system with activated carbon; To - pretreatment via air stripping.					
Factual Basis: Cost-effectiveness of treatment train.						
Region 7 Peoples FMGP, IA	9/91	6/5/97	PRP	Soil, Sludges	State review and concurrence.	Fed = 38 hrs; Contr. = \$0
	8/97 [Letter]	8/19/97				Est'd Savings = minimal
	Type of Change: From - incineration of wastes at PRP-owned boiler; To - incineration at another boiler utility.					
Factual Basis: Technical review of the alternative for high capacity boiler will save time (about 12 months).						

Region Site Name, State	Date of <u>Original ROD</u> Date of Change [ESD/ROD-A]	Date Review <u>Commenced</u> Date Review Completed	Change Initiator	Media	State/ Community Involvement	Est'd Resource Demands - <u>Fed/Contr.</u> Est'd Cost Savings
Region 7 - FY96						
Region 7 Chemplex, IA	9/27/89	12/4/95	PRP	Groundwater	State concurred; public availability of change.	Fed = 50 hrs; Contr. = \$0
	1/26/96 [Other: letter to file]	1/26/96				Est'd Savings = \$0.2 M
	Type of Change: State regulation standard for tetrachloroethylene (PCE) amended: From - .7 ug/l standard; To - 5.0 ug/l.					
Factual Basis: Previous standard impractical based on new data.						
Region 7 Doepke - Holliday, KS	9/21/89	2/16/95	PRP	Groundwater, Leachate, Surface Water	State concurred. Public notified; ESD placed in Administrative Record; no comments received.	Fed = 240 hrs; Contr. = \$11,200
	2/6/96 [ESD]	2/6/96				Est'd Savings = \$1 million
	Type of Change: From - collection and treatment; To - monitoring after installation of multi-layer cap.					
Factual Basis: Groundwater seepage is occasional and continues to be monitored.						
Region 7 Hastings Well #3 OU #13, NE	6/30/93	11/95	City	Groundwater	State and EPA concurred. City involved.	Fed = 100 hrs; Contr. = \$10,000
	7/23/96 [ESD]	7/23/96				Est'd Savings = no estimate calculated
	Type of Change: From - reinjection; To - potential reuse of extracted groundwater.					
Factual Basis: Groundwater to be used for spray irrigation.						

Region Site Name, State	Date of Original ROD Date of Change [ESD/ROD-A]	Date Review Commenced Date Review Completed	Change Initiator	Media	State/ Community Involvement	Est'd Resource Demands - Fed/Contr. Est'd Cost Savings
Region 7 John Deere Dubuque Works, IA	9/28/88	10/27/95	State	Groundwater	State concurred; public availability of change.	Fed = 30 hrs; Contr. = \$0
	11/28/95 [Other: letter to file]	11/28/95				Est'd Savings = not available
	Type of Change: From - State MCLs deferral; To - Federal MCLs.					
	Factual Basis: Attainment of goal was impractical; no loss in protection.					
Region 7 McGraw Edison, IA	9/93	4/8/94	PRP	Soil	State concurred with change; public was notified.	Fed = 60 hrs; Contr. = \$10,000
	6/96 [ESD]	6/96				Est'd Savings = \$0.4 million
	Type of Change: From - cleanup level of 200 ppb; To - cleanup level of 750 ppb for TCE.					
	Factual Basis: Supplemental source soil/groundwater modeling.					
Region 7 Mid-America Tanning, IA	9/24/91	3/14/95	EPA	Sludge, Soil, Solid Waste, Surface Water	State concurred; no public comments. EPA offered to hold public meeting.	Fed = 200 hrs; Contr. = \$5,000
	7/29/96 [ROD-A]	10/25/95				Est'd Savings = \$2 million
	Type of Change: From - in-situ stabilization and capping; To - in-situ stabilization for only more highly contaminated sludges and more impenetrable cap barrier.					
	Factual Basis: New information showing presence of H ₂ S gas.					
Region 7 Red Oak Landfill, IA	1/31/93	7/95	EPA	Groundwater, Soil	State concurred; public availability of change; public was notified.	Fed = 150 hrs; Contr. = \$0
	1/30/96 [ESD]	1/30/96				Est'd Savings = \$0.8 million
	Type of Change: From - thorough slope stability analysis; To - reshaping and revegetation of slope.					
	Factual Basis: Slope stability analysis following 1993 floods.					

Region Site Name, State	Date of Original ROD Date of Change [ESD/ROD-A]	Date Review Commenced Date Review Completed	Change Initiator	Media	State/ Community Involvement	Est'd Resource Demands - Fed/Contr. Est'd Cost Savings
Region 7 Weldon Spring, MO	9/27/93	11/95	State	Debris, Soil, Solid Waste	Public notice in local paper; public meeting; DOE contacted citizen's group; State involved throughout change process.	Fed = 53 hrs; Contr. = \$0
	1/18/96 [ESD]	1/18/96				Est'd Savings = \$0
	Type of Change: From - use of separate landfills; To - combination of landfills.					
Factual Basis: Similar waste on adjacent DOE property; value engineering study.						
Region 8 - FY97						
Region 8 Libby Groundwater, MT	12/30/88	1/24/95	EPA	Groundwater, Soil	State reviewed and provided comments on ESD; public notice and fact sheet.	Fed = 160 hrs; Contr. = \$12,000 (incl. 5-yr review)
	1/22/97 [ESD]	5/30/96				Est'd Savings = probably no savings
	Type of Change: From - excavation and biotreatment of soils within on-site land treatment unit, in-situ biotreatment of groundwater, and pump and treat/bioreactor system; To - new MCLs for certain groundwater contaminants and revised remediation levels.					
Factual Basis: Revised toxicology assessments and change in promulgated MCL for primary contaminant.						
Region 8 Ogden Depot (OU2), UT	9/7/90	3/1/96	Fed. Fac.	Groundwater	State reviewed and concurred with this proposal.	Fed = 20 hrs. Contr. = \$640
	10/15/96 [ESD]	10/15/96				Est'd Savings = None
	Type of Change: From - Treat groundwater until cleanup level is below MCLs; To - Treat groundwater until cleanup level is at or below MCLs.					
Factual Basis: Original objective was too stringent by law.						

Region Site Name, State	Date of Original ROD Date of Change [ESD/ROD-A]	Date Review Commenced Date Review Completed	Change Initiator	Media	State/ Community Involvement	Est'd Resource Demands - Fed/Contr. Est'd Cost Savings
Region 8 Summitville Mine, CO	12/15/95 5/16/97 [Memo to files]	1/15/96 5/30/96	EPA	Surface Water	Colorado Department of Public Health and Environment.	Fed = hrs. Contr. = not included -- in part of standard design Est'd Savings = \$350,000
Type of Change: From - Acid mine drainage discharged to treatment plant; To - Acid mine drainage discharged to surface impoundment and then treatment prior to release.						
Factual Basis: Modifications were made in the Water Treatment Interim ROD to optimize the performance and minimize costs of the selected remedy during remedy design.						
Region 8 Summitville Mine, CO	12/15/95 6/4/97 [ESD]	9/1/95 4/1/96	EPA, State	Leachate	State concurred.	Fed = 0 hrs; Contr. = \$0 Est'd Savings = \$1.7 million
Type of Change: From - in-situ biotreatment of cyanide and cap; To - rinsing with clean water and treatment of leachate.						
Factual Basis: Cyanide levels in leachate were reduced without biological treatment.						
Region 8 - FY96						
Region 8 Chemical Sales, CO	6/27/91 12/11/95 [ESD]	3/93 11/1/95	EPA	Soil, Groundwater	State concurred with ESD and changes to selected remedy. ESD placed in Administrative Record.	Fed = 180 hrs; Contr. = \$10,000 Est'd Savings = \$1.5 million
Type of Change: From - recirculation of treated exhaust gases into soil, and air stripping of groundwater; To - eliminate recirculation of soil, and air sparging for groundwater, and From - catalytic oxidation of soil vapors; To - resin absorption.						
Factual Basis: New hydrogeologic information obtained during design and more effective remedy.						

Region Site Name, State	Date of Original ROD Date of Change [ESD/ROD-A]	Date Review Commenced Date Review Completed	Change Initiator	Media	State/ Community Involvement	Est'd Resource Demands - Fed/Contr. Est'd Cost Savings
Region 8 Idaho Pole, MT	9/28/92	6/95	PRP, EPA	Groundwater, Soil	State reviewed and provided comments on ESD; public meeting and fact sheets.	Fed = 160 hrs; Contr. = \$10,000
	5/21/96 [ESD]	12/95				Est'd Savings = not available
	Type of Change: From - water flushing of soils and biological treatment of groundwater; To - ambient temperature water flushing of soils and carbon adsorption of groundwater.					
Factual Basis: Additional information in design replaced design problem in original ROD remedy.						
Region 8 Old Minot Landfill, ND	6/21/93	11/7/95	PRP	Leachate, Landfill gas	City involved in cleanup; limited community interest.	Fed = 100 hrs; Contr. = \$0
	5/2/96 [ESD]	5/2/96				Est'd Savings = \$0.3 million
	Type of Change: From - active methane gas extraction and leachate collection system; To - passive collection system and cap design changes, and From - proposed active leachate extraction system, To - passive gravity drain system and limits of buried waste extended.					
Factual Basis: New information regarding limits of buried waste and equivalent protection at less cost.						
Region 8 Wasatch Chemical, UT	3/29/91	5/17/93	PRP	Groundwater, Soil, Surface water, Site boundary	State concurred Fact sheets provided to community and State.	Fed = 80 hrs; Contr. = \$4,000
	11/30/95 [ESD]	6/9/95				Est'd Savings = \$244,000
	Type of Change: From - asphalt cover for soils; To - eliminate cover to prevent stormwater control problems and change site boundaries.					
Factual Basis: Additional data from investigations during design, including reduction of stormwater discharge and differences in site boundaries.						

Region Site Name, State	Date of Original ROD Date of Change [ESD/ROD-A]	Date Review Commenced Date Review Completed	Change Initiator	Media	State/ Community Involvement	Est'd Resource Demands - Fed/Contr. Est'd Cost Savings
Region 9 - FY97						
Region 9 Apache Powder, AZ	9/30/94 4/16/97 [ESD]	11/96 2/97	EPA	Groundwater	Public meeting, State comments.	Fed = 600 hrs; Contr. = \$3,000 Est'd Savings = \$13M
Type of Change: From - Extraction from 7 wells in perched ground water with treatment by brine concentrator; extraction from 4 wells in shallow aquifer with treatment by constructed wetlands; To -Extraction from 4 total wells in shallow aquifer with treatment in 2 constructed wetland systems in different locations.						
Factual Basis: Reduced nitrate and water levels in perched ground water enabling dewatering of this zone by pumping from shallow aquifer and elimination of brine concentrator. Wetland location change enabled simpler construction, including elimination of pond liners.						
Region 9 Fort Ord, CA (OU 2)	8/94 1/17/97 [ESD]	 1/97	Fed. Fac.	Soil	State concurred; public meeting; 60-day public comment period.	Fed = hrs; Contr. = \$0 Est'd Savings = \$11 million
Type of Change: From- Landfill cap; To- Consolidation of wastes into the existing landfill from other Fort Ord wastes and subsequent capping.						
Factual Basis: Cost and groundwater modeling. Savings resulted from avoiding cost of offsite disposal of soil from other sites.						
Region 9 Lawrence Livermore National Laboratory (Main Site), CA	7/15/92 4/16/97 [ESD]	1/97 4/97	DOE/ LLNL	Groundwater	Cal/EPA(Both DTSC and RWGCB) involved. Public notified during public meetings; no public comments received.	Fed = hrs; Contr. = Est'd Savings = \$220,000/year
Type of Change: From - Use of ultraviolet/hydrogen peroxide (UV/H ₂ O ₂) and air stripping groundwater treatment technologies at treatment facilities A and B (TFA and TFB); To - Air stripping only groundwater treatment systems at TFA and TFB.						
Factual Basis: Sampling results show VOC levels decreasing; no UV/H ₂ O ₂ system needed; air stripping alone OK.						

Region Site Name, State	Date of Original ROD Date of Change [ESD/ROD-A]	Date Review Commenced Date Review Completed	Change Initiator	Media	State/ Community Involvement	Est'd Resource Demands - Fed/Contr. Est'd Cost Savings
Region 9 Lawrence Livermore National Laboratory (Main Site), CA	7/15/92	1/97	DOE/ LLNL	Groundwater	Cal/EPA involved. Public notified during public meetings; no public comments received.	Fed = hrs; Contr. = Est'd Savings = None
	4/15/97 [ESD]	4/97				
	Type of Change: From - Fixed metals discharge limits; To - Seasonal (wet/dry season) metals discharge limits.					
	Factual Basis: Changes made after original discharge permit expired. Seasonal limits are more protective.					
Region 9 San Fernando Valley Area 1, Burbank OU, CA	6/89	3/95	PRP	Groundwater	No objections from State or community.	Fed = 600 hrs; Contr. = \$5,000
	2/97 [ESD]	2/97				Est'd Savings = \$49 million
	Type of Change: From - extract and treat groundwater using air or steam stripping and vapor phase granular activated carbon; To - extracted volume reduced by 25%.					
	Factual Basis: New information from design review process and reduced volume levels.					
Region 9 Selma Pressure Treating, Selma, CA	9/88	3/97	EPA	Groundwater	DTSC reviewed and commented; fact sheets were sent to people on a community distribution list; public comment period provided.	Fed = hrs; Contr. = \$
	4/18/97 [ESD]	4/97				Est'd Savings = TBD
	Type of Change: From - Return of effluent via reinjection wells; To - Return of effluent via percolation ponds.					
	Factual Basis: Reconsideration of certain technical information during design and additional data gathered pursuant to ROD.					
Region 9 Tucson International Airport, AZ	8/88	11/94	Fed. Fac.	Air, Groundwater	State and community support the change.	Fed = 200 hrs; Contr. = \$0
	2/27/97 [ESD]	2/97				Est'd Savings = no net savings
	Type of Change: From - air stripping and municipal end use; To - air stripping with emission control and reinjection end use.					
	Factual Basis: Community and city objected to delivery of treated ground water into drinking water distribution system.					

Region Site Name, State	Date of Original ROD Date of Change [ESD/ROD-A]	Date Review Commenced Date Review Completed	Change Initiator	Media	State/ Community Involvement	Est'd Resource Demands - Fed/Contr. Est'd Cost Savings
Region 9 United Heckathorn Co., CA	10/26/94 11/96 [ESD]	7/95 11/96	PRP	Sediment	State and community generally supportive.	Fed = 700 hrs; Contr. = \$0 Est'd Savings = no net savings
Type of Change: From - dredged material disposed at one landfill; To - different landfill.						
Factual Basis: More rapid disposal.						
Region 9 - FY96						
Region 9 Fort Ord, CA (OU 2)	8/94 8/13/96 [ESD]	 8/13/96	Fed. Fac.	Groundwater	State concurred.	Fed = hrs; Contr. = \$0 Est'd Savings = None
Type of Change: From- Unestablished lower aquifer cleanup levels; To- Establish lower 180 ft. aquifer cleanup levels.						
Factual Basis: Set ground water cleanup levels at MCLs.						
Region 9 Koppers (Oroville), CA	9/89 8/29/96 [ROD-A]	3/94 8/96	PRP	Soil	High level of State and community involvement and support. Public comment period; public meeting; fact sheet issued; City and State concurred.	Fed = 1600 hrs ⁹ ; Contr. = \$15,000 Est'd Savings = \$15 million
Type of Change: From - innovative treatment of soils to residential levels; To - Excavate and dispose in an on-site landfill to industrial land use levels.						
Factual Basis: Treatability testing results were unfavorable to original technology, discovery of more extensive mixed contamination, and change in land use scenario.						

⁹ Long-term project with extensive community involvement; severe differences in design compared to actual contamination; EPA made many changes to ROD.

Region Site Name, State	Date of Original ROD Date of Change [ESD/ROD-A]	Date Review Commenced Date Review Completed	Change Initiator	Media	State/ Community Involvement	Est'd Resource Demands - Fed/Contr. Est'd Cost Savings
Region 9 Middlefield - Ellis - Whisman (MEW) Study Area, CA	6/89	10/95	PRP	Groundwater	None.	Fed = 500 hrs; Contr. =
	4/6/96 [ESD]	4/96				Est'd Savings = \$150,000
	Type of Change: From - Air stripping with vapor phase granular activated carbon (GAC) treatment; To - Air stripping with liquid GAC treatment.					
	Factual Basis: Numerical standards characterized as “goals” in the original ROD are now the final cleanup “standards” per the ESD.					
Region 9 Nineteenth Ave. Landfill, AZ	9/29/89	11/94	PRP, State, Comm.	Groundwater, Leachate, Solid waste	State-lead project; State and community Technical Advisory Group requested change.	Fed = 40 hrs; Contr. = \$0
	11/95 [ESD]	11/95				Est'd Savings = not available (higher capital cost, lower maintenance cost)
	Type of Change: From - old liner system; To - different type of impermeable liner.					
	Factual Basis: To reduce maintenance problems and improve reliability.					
Region 9 Phoenix-Goodyear, AZ	9/26/89	10/94 (oral), 9/95 (written)	EPA, PRP	Groundwater	No State or community opposition. Public notified; public comment period; ESD and other documents placed in Administrative Record.	Fed = 80 hrs; Contr. = \$0
	12/22/95 [ESD]	12/95				Est'd Savings = not available
	Type of Change: From - pump and treat using air stripping followed by liquid phase granular activated carbon; To - air sparging and inclusion of a metal adsorption treatment system.					
	Factual Basis: More effective and accelerated removal of VOCs; treatability study indicating more effective removal of chromium from groundwater; cost-effective response.					

Region Site Name, State	Date of Original ROD Date of Change [ESD/ROD-A]	Date Review Commenced Date Review Completed	Change Initiator	Media	State/ Community Involvement	Est'd Resource Demands - Fed/Contr. Est'd Cost Savings
Region 9 Purity Oil, CA	9/92	8/95	PRP	Soil	State support; no community objections.	Fed = 1000 hrs ¹⁰ ; Contr. = \$0
	7/3/96 [ESD]	7/96				Est'd Savings = \$26 million
	Type of Change: From - slurry wall and extensive soil vapor extraction system; To - no slurry wall and change in design of soil vapor extraction.					
	Factual Basis: New information on soil and waste characterization in pre-design.					
Region 9 Williams AFB, OU2, AZ	12/30/92	5/96	Fed. Fac.	Soil Groundwater	The public was invited to comment through public comment periods advertised in local newspapers and public meeting. The RAB was briefed in the proposed change in remedy.	Fed = hrs; Contr. = \$
	8/16/96 [ROD-A]	8/96				Est'd Savings = TBD
	Type of Change: From - Separated deep soil (>25 ft.) into OU3; To - returned deep soils into OU2 and propose SVE to treat deep soils.					
	Factual Basis: Results of treatability studies performed at OU2 and OU3.					

¹⁰ Intensive in-house technical and enforcement review over 2-year period; multiple meetings of the EPA team and PRPs.

Region Site Name, State	Date of Original ROD Date of Change [ESD/ROD-A]	Date Review Commenced Date Review Completed	Change Initiator	Media	State/ Community Involvement	Est'd Resource Demands - Fed/Contr. Est'd Cost Savings
Region 10 - FY97						
Region 10 Commencement Bay Nearshore/ Tideflats, WA	9/30/89	6/95	PRP	Sediment	Fact sheets/public notices and meetings held; responded to >50 comments (verbal/written). State concurred but Puyallup Tribe did not concur.	Fed = 2,000 hrs ¹¹ ; Contr. = \$7,000
	7/28/97 [ESD]	7/28/97				Est'd Savings = \$13 million
	Type of Change: From - PCB sediment cleanup levels after 10 years; To - Slightly higher levels of PCBs in sediment immediately after cleanup and after 10 years.					
Region 10 Gould, OR	Factual Basis: New modeling (toxicity and exposure assumptions) and cost estimates justified new response levels.					
	3/31/88	5/94	PRP	Debris, Sediment, Soil	State reviewed and concurred; fact sheet distributed to community; other interested parties and PRPs; no comments from community.	Fed = 800 hrs; Contr. = \$0
	6/3/97 [ROD-A]	6/3/97				Est'd Savings = \$15 million
	Type of Change: From - treatment and recycling of lead contaminated materials; To - treatment and containment (stabilize waste and consolidate in a lined and capped on-site containment facility).					
	Factual Basis: Additional investigation showed volume of waste is smaller than originally presumed and new remedy is more efficient and cost-effective. Cleanup activities coordinated with adjacent facility.					

¹¹ The process took over one year - involved numerous reviews and responses to comments; coordinated with trustees and the public; and reviewed technical decisions.

Region Site Name, State	Date of Original ROD Date of Change [ESD/ROD-A]	Date Review Commenced Date Review Completed	Change Initiator	Media	State/ Community Involvement	Est'd Resource Demands - Fed/Contr. Est'd Cost Savings
Region 10 Hanford 100 Area, WA	9/28/95	4/96	EPA, State, Fed. Fac.	Debris, Soil, Solid waste	Public notices - received comment supporting change; fact sheets issued; Fed. Fac. Sponsored Advisory Committee meeting; State concurred.	EPA: 4 mos., DOE: 12 mos. + 3 FTE for contractors, State: 8 mos.
	4/4/97 [ROD-A]	4/4/97				Est'd Savings = \$297 million
	Type of Change: From - excavation, treatment and on-site disposal to clean up 37 sites; To - Streamlining of the original 37 sites plus excavation and on-site disposal of 34 more sites with similar wastes.					
Factual Basis: No technology change; value engineering and inter-organizational coordination regarding improved soil volume estimates and reduction in sampling and analysis costs.						
Region 10 Teledyne Wah Chang, OR	6/10/94	3/96	PRP	Groundwater, Sediment, Soil	Public notice; public comment period; no comments received; State was part of negotiations leading to change and concurred with ESD.	Fed = 800 hrs; Contr. = \$0
	10/8/96 [ESD]	9/19/96				Est'd Savings = \$1.1 million
	Type of Change: Modifications to ground water remedy: From - groundwater extraction at and outside the plant boundaries; To - on-site hot-spot ground water remediation and monitored natural attenuation.					
Factual Basis: Monitoring of groundwater during design indicated significant decreases of concentrations.						
Region 10 Toftdahl Drums, WA	9/30/86	2/97	State	Groundwater	State discussed proposed changes with nearby residential property owners; State and EPA issued public notice (no comments).	Fed = 6 hrs; Contr. = \$0
	6/17/97 [ESD]	6/17/97				Est'd Savings = \$5,000
	Type of Change: From - 15 years of ground water monitoring; To - cease ground water monitoring after 10 years.					
Factual Basis: Monitoring determined that no threat posed to public health and safety.						

Region Site Name, State	Date of Original ROD Date of Change [ESD/ROD-A]	Date Review Commenced Date Review Completed	Change Initiator	Media	State/ Community Involvement	Est'd Resource Demands - Fed/Contr. Est'd Cost Savings
Region 10 - FY96						
Region 10 Bunker Hill Mining and Metallurgical Complex, ID	9/22/92 9/9/96 [ROD-A]	1/96 9/9/96	EPA	Soil	Notices and public meetings; only one comment letter received from Coeur d'Alene Tribe; State concurred with change.	Fed = 200 hrs; Contr. = \$3,500 Est'd Savings = \$6.2 million
Type of Change: From - stabilization/cap in a closure cell; To - waste encapsulation and cap.						
Factual Basis: Post-ROD leachability study inconclusive for previous remedy; new remedy provides cost-effectiveness for equivalent protection.						
Region 10 Harbor Island (Soil and Ground Water Operable Unit), WA	9/30/93 1/25/96 [ROD-A]	4/11/95 1/25/96	PRP	Soil	Public notice - few comments received; State concurred with change.	Fed = 200 hrs; Contr. = \$0 Est'd Savings = \$2 million
Type of Change: From - thermal desorption of petroleum- contaminated soil; To - off-site disposal of petroleum-contaminated soil that is not a hazardous nor dangerous waste.						
Factual Basis: Re-evaluation of site conditions and options provided more cost-effective and timely but still protective clean up.						
Region 10 Western Processing, WA	9/25/85 12/11/95 [ESD]	9/12/95 12/11/95	PRP	Groundwater, Soil	Fact sheet issued; local government and State support; low level of community interest.	Fed = 700 hrs; Contr. = \$30,000 Est'd Savings = \$82 million
Type of Change: From - slurry wall and pump and treat for contaminant mass removal and protect surface waters; To - source contaminant with inward gradient within slurry wall, plume containment outside slurry wall, bioremediation, and other treatment of hot spots.						
Factual Basis: Updated information after 5+ years of pumping and more cost-effective response.						

Appendix A.2:
**Summary of Remedy Update Information for FY96 and
FY97 for Sites With Cost Increases**

NOTE: The information and data presented in Appendix A.2 represents only a portion of the information available in the decision document. If more information is needed, please refer to the site's ESD, ROD-Amendment, memo-to-file, or letter.

**Appendix A.2: Summary of Remedy Update Information for FY96 and FY97 for
Sites with Cost Increases**

Region Site Name, State	Date of Original ROD Date of Change [ESD/ROD-A]	Date Review Commenced Date Review Completed	Change Initiator	Media	State/ Community Involvement	Est'd Resource Demands - Fed/Contr. Est'd Cost Savings
Region 2 Robintech, NY	3/92	1/97	EPA, PRP	Soil, Groundwater	Some State and public interest.	Fed = 200 hrs; Contr. = \$ Est'd Increase = \$700,000
	7/97 [ROD-A]	9/97				
	Type of Change: From - Extraction and air stripping of bedrock and overburden groundwater; To - Excavate and treat using low temperature thermal desorption for soils, natural attenuation for overburden groundwater and treatment of bedrock aquifer. Factual Basis: Additional information gathered in design made it apparent that the geology of the overburden was unsuitable for the implementation of a groundwater extraction system.					
Region 2 Imperial Oil/Champion Chemical, NJ	9/90	7/96	EPA	Soil	State concurrence, full State and community support.	Fed = 10 hrs; Contr. = \$ Est'd Increase = TBD
	9/97 [ESD]	7/96				
	Type of Change: From - Excavation and offsite disposal of soil within wetlands; To - Additional excavation and off-site disposal for soil in off-site area 2. Factual Basis: Comprehensive sampling data in design showed a greater value of soil contamination present.					
Region 4 Coleman-Evans Wood Preserving, FL	9/25/86	6/30/92	EPA	Debris, Groundwater, Soil, Sediment	State supported EPA throughout the process. Fact sheet issued to public, no comments received.	Fed = 1000 ¹ hrs; Contr. = \$250,000 Est'd Increase = \$12M
	9/25/97 [2 nd ROD-A]	4/30/95				
	Type of Change: From - Soil washing, bioremediation, and solidification/stabilization; To - Thermal desorption with a contingency of capping. Factual Basis: Due to the discovery of dioxin at the site and the inability of bioremediation to treat dioxin, the remedy was amended.					

¹Evaluated treatability study results; prepared supplemental feasibility study; extensive characterization of dioxin, both onsite and offsite; conducted public meeting and community interviews; and negotiated with the State.

Region Site Name, State	Date of <u>Original ROD</u> Date of Change [ESD/ROD-A]	Date Review <u>Commenced</u> Date Review Completed	Change Initiator	Media	State/ Community Involvement	Est'd Resource Demands - Fed/Contr. Est'd Cost Savings
Region 4 National Electric Coil/Cooper Industries, KY	4/96	11/5/96	PRP	Groundwater	State concurred with ESD. Public was notified by fact sheet.	Fed = 200 hrs; Contr. = \$ Est'd Increase = \$300,000
	7/97 [ESD]	7/97				
	Type of Change: From - Extraction wells; To - interceptor trench for "shallow" groundwater recovery method.					
	Factual Basis: Shallow aquifer was determined to be poor water formation during dry periods; trench is a more passive means to recover contaminated water.					
Region 9 Westinghouse, CA	10/16/91	1/94	PRP	Soil	Notified community via fact sheet and community meeting held 2/20/97.	Fed = hrs; Contr. = \$ Est'd Increase = \$500,000
	3/14/97 [ESD]	2/97				
	Type of Change: From - Incineration of PCB soils with concentrations greater than 25 ppm; To - Landfilling PCB soils with concentrations between 25-500 ppm and incinerating soils with concentrations greater than 500 ppm.					
	Factual Basis: The ESD only applies to newly discovered contaminated soil found in the North parking Lot. PRP requested change which is applicable for TSCA. Change requested because company wanted to sell half of parking lot acreage to a corporate neighbor who will use the lot to build a warehouse.					

Appendix B:

Summary of Regional Implementation Plans

NOTE: EPA requested that Regions provide their strategy for implementing the Updating Remedy Decisions reform. The following implementation plans should be viewed as “living” documents, and subject to possible future revisions.

Appendix B:
Summary of Regional Implementation Plans

Region	Date Submitted	Strategy for Fund-lead Sites	Strategy for Other-lead Sites	General Comments
1	11/25/97	Region 1 has developed draft criteria to review sites and remedies. These have been forwarded to EPA Headquarters.	Region 1 continuously reviews remedies with States and PRPs to identify any new technologies or policy changes that could expedite the cleanup.	<p>Region 1 is receptive to PRP requests for modifying a remedy.</p> <p>There is no backlog of PRP requests in the Region.</p> <p>Region 1 anticipates completing remedy updates at six sites during FY98.</p>

Region	Date Submitted	Strategy for Fund-lead Sites	Strategy for Other-lead Sites	General Comments
2	1/18/98	<p>The Region 2 remedy review team will meet for four hours per week to review RODs, design documents, Five Year Reviews, or other technical documentation of the remedy and for team discussion with the Remedial Project Manager (RPM). The team's goal will be to provide assistance to RPMs in determining if a remedy update could benefit site cleanup activities.</p> <p>The focus of the reviews will be on older remedies. The team will generally not consider sites that are currently targeted for construction completion by the end of year 2000.</p> <p>The team will also review any site that the RPM requests. The group will provide a monthly status report to the Director which will indicate the number of remedies reviewed and the status of the work group recommendations. In five months, all Fund-lead operable units where construction has not begun will have been reviewed.</p>	<p>Region 2 continues to review every proposed remedy change requested by responsible parties (RPs).</p> <p>The site project manager and the appropriate technical staff and management will conduct all reviews of PRP-proposed changes.</p>	<p>Region 2 will continue to track every request to review a remedy and will report on the number of ESDs or ROD Amendments issued.</p> <p>Region 2 will track the estimated cost savings if appropriate.</p> <p>The entire review is expected to last approximately five months.</p>

Region	Date Submitted	Strategy for Fund-lead Sites	Strategy for Other-lead Sites	General Comments
3	12/13/97	<p>All remedies at Fund-lead sites should be evaluated for possible changes during the Five Year Review. Reviews will be conducted by the site's RPM, the ORC attorney, the Remedial Section Chief and a member of Regional technical support group. Region 3 may also involve the Office of Research and Development and the Remedy Review Board.</p> <p>Any potential remedy change can be considered up until the Remedial Design (RD) phase is 30 percent complete.</p> <p>New technologies and more cost effective strategies will be periodically reviewed as part of the monthly Regional RPM meetings.</p>	<p>All remedies at PRP-lead sites should be evaluated for possible changes during the Five Year Review.</p> <p>Changing the remedy is always open to discussion. RPMs create a climate of open discussion with RPs and are open to review requests at any time.</p> <p>New technologies and more cost effective strategies will be periodically reviewed as part of the monthly Regional RPM meetings.</p>	RPMs will also maintain the resources to implement the original remedy, should the remedy change not be feasible.

Region	Date Submitted	Strategy for Fund and Other-lead Sites	General Comments
4	12/22/97	<p>Remedy review considerations occur continuously at all Regional remedial sites throughout the RD phase (and to some degree during the early stages of Remedial Action (RA)).</p> <p>Requests from EPA, the PRP, the State, or Federal facilities can trigger a remedy review.</p> <p>All remedies will be evaluated as part of the Five Year Review process, which will occur at least once on all sites and will occur every 5 years for all long-term response actions.</p> <p>Supplemental alternatives that demonstrate a likelihood of significantly decreasing the duration of a long-term remedial action or attaining a much better end-point at potential technical impracticability (TI) sites will be considered in the routine review process of evaluating remedy implementation.</p>	<p>The primary criteria Region 4 will use to determine whether to revise a remedy are: 1) Is it equally or more protective of human health and the environment? 2) Is it more cost and/or technically effective? 3) What effect will the remedy change have on the speed and timeliness of cleanup?</p> <p>For FY 98, Region 4 will continue to identify and track sites that are evaluating alternative approaches to the remedy selected in the ROD.</p>

Region	Date Submitted	Strategy for Fund and Other-lead Sites	General Comments
5	12/16/97	<p>The Region will continue to respond to requests for remedy changes from stakeholders (PRPs, States, communities). Requests can be made verbally or in writing and should initially be directed to the site RPM.</p> <p>The Region will use a portfolio management concept for updates which includes:</p> <ul style="list-style-type: none"> - A uniform set of critical project milestones for each phase of the remedial pipeline; and - A set of questions for use during the RI/FS/Remedy Selection phase to enhance the dialogue between RPMs and first-line managers on areas of national programmatic focus (e.g., lead, groundwater, National Remedy Review Board (NRRB) criteria). <p>In FY98, first-line supervisors will expand the dialogue with each RPM to include a discussion on potential for updating the site remedy.</p> <p>Region 5 is committed to exploring the development of Operations and Maintenance (O&M) experts during FY98. O&M experts will review projects in long-term Response Action for possible changes.</p>	<p>During FY96, remedy updates were completed at six sites, for an estimated \$58.1 million in cost savings. During FY97, remedy updates were completed at 16 sites, for an estimated \$137.1 million in cost savings.</p> <p>For both years, the majority of remedy changes were initiated by PRP requests.</p>

Region	Date Submitted	Strategy for Fund-lead Sites	Strategy for Other-lead Sites	General Comments
6	12/16/97	<p>Any site where a remedy has been selected may be reviewed.</p> <p>Requests for a remedy update are evaluated by the Regional office.</p> <p>A review may be triggered by:</p> <ul style="list-style-type: none"> - A request from a PRP, a State or local environmental or health agency, or a community group; or - Information generated by the Regional office, either as part of a remedial design or a site Five Year Review. <p>Region 6 considers all remedy review requests.</p>		<p>Proposed changes to remedies must be at least as protective and cost effective as the remedy already selected.</p> <p>Some remedies will not be changed if the proposed alternative provides less overall protection of human health and the environment, or does not comply with applicable regulations.</p>

Region	Date Submitted	Strategy for Fund and Other-lead Sites	General Comments
7	11/25/97	<p>All Superfund remedial sites are eligible for remedy review.</p> <p>Sites will be identified by stakeholders, such as: PRPs; State environmental and health agencies; local city and county government; local formal and informal community groups; EPA technical staff; and the EPA Regional Superfund Ombudsman.</p> <p>Where appropriate, sites subject to Five Year Review will be considered as possible update remedy candidates depending on the protectiveness and effectiveness of each site remedy. In addition to revisions based on advances in remediation, science and technology, Region 7 will consider remedy improvements indicated by additional post-ROD sampling and analytical data, remedy performance data gathered from a post-ROD period of operation, and other factors.</p>	<p>Generally, the criteria for updating a remedy will be whether the proposed change to the remedy is equally or more protective of human health and the environment, and equally or more cost and technically effective.</p> <p>Region 7 has compiled a list of FY98 candidate remedy update sites. The list will be updated at least quarterly and will track completed reviews and resulting decisions.</p>

Region	Date Submitted	Strategy for Fund-lead Sites	Strategy for Other-lead Sites	General Comments
8	12/31/97	<p>EPA RPMs and State staff are expected to identify opportunities for remedy changes. Some of these become evident as designs are completed; as the remedy is being implemented; and during the O&M phase or at the Five Year Review.</p> <p>A determination must be made on the significance of the change to determine whether the change should be a ROD Amendment, ESD, or minor change that should be documented in the record.</p> <p>Region 8 plans to track these three types of changes in CERCLIS.</p>	<p>Any stakeholder may request a review (<i>i.e.</i>, PRPs, Federal facilities, State, community, or local government). Region 8 expects that Five Year Reviews may result in remedy updates at many sites. All requests must be documented in writing and placed in the Superfund Record Center.</p> <p>Region 8 will evaluate all requested updates to RODs in a two-phased process. The request will first be screened to determine if there is adequate supporting rationale for the request (e.g., new data not considered in the ROD, new technology not evaluated in the ROD, new risk information, new cost estimates, or a change in land-use nearby). If sufficient rationale exists, a more detailed analysis will be done to determine whether an update is warranted based on the nine criteria, and what form it should take.</p>	<p>Project staff will be expected to follow the two-step process and keep appropriate records on how the requests were handled.</p> <p>A Superfund Reforms seminar, which will include a discussion of key reforms and an explanation of expectations for site teams in evaluating review requests, will be held during the second quarter of 1998 for all Regional Superfund staff.</p>

Region	Date Submitted	Strategy for Fund-lead Sites	Strategy for Other-lead Sites	General Comments
9	1/6/98	<p>Region 9 will consider all requests for remedy changes. All sites are considered to be equally eligible for changes. Decisions on remedy changes will be made at the Branch Chief level. The procedure for review and response will be determined on a case-by-case basis.</p> <p>Managers of projects in the design phase are being encouraged by their supervisors to actively seek opportunities to refine remedies to reduce cost and/or improve effectiveness.</p> <p>Where new information indicates that a remedy is not meeting objectives, Region 9 will consider modification of the remedy and, where appropriate, a technical impracticability waiver.</p> <p>Region 9 will address the potential for remedy update in all Five Year Reviews.</p>	<p>All sites are considered to be equally eligible for changes.</p> <p>Federal facility remedy update activities will generally be consistent with the Fund-lead sites, although the fact that the Federal agencies have lead responsibilities requires that these sites be managed in different ways.</p>	<p>As part of Region 9's FY98 planning process, each section chief in the Superfund Site Cleanup Branch prepared a Section Operating Plan which included site-specific plans for the upcoming fiscal year. These plans discussed how Superfund Reforms would be implemented on a site-specific basis, including the potential for updating remedies at each site during FY98. Region 9 identified 12 sites as potential candidates for remedy updates in FY98.</p> <p>Region 9 recommends that a national analysis of past remedy updates be conducted to determine what has been accomplished to date and where the best opportunities may lie for other projects.</p>

Region	Date Submitted	Strategy for Fund-lead Sites	Strategy for Other-lead Sites	General Comments
10	12/4/97	<p>All sites are considered to be equally eligible for changes.</p> <p>Generally, these sites are identified by the people who are most familiar with the sites: the EPA RPMs working together with the State, Federal facility, and PRP site managers.</p> <p>All sites undergoing Five Year Reviews will also be considered as possible update remedy candidates.</p>	<p>All sites are considered to be equally eligible for changes.</p> <p>Requests received from other parties, including the PRPs and the public, would receive equal consideration and priority with those updates identified by the site managers.</p> <p>All sites undergoing Five Year Reviews will also be considered as possible update remedy candidates.</p>	<p>Five sites are under review for potential remedy updates (3 Federal facilities; 1 State-lead; 1 Federal-lead fund-financed).</p> <p>Region 10 has no backlog of sites where a remedy update has been requested but where the Region has not started the review.</p> <p>Post-ROD sampling and remedy performance information are among the many possible sources of information for remedy updates.</p> <p>Region 10 has not had any requests for updates based on new State ARARs, but anticipates them in the future.</p>