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RCRA, Superfund & EPCRA Hotline Training Module

Introduction to:

Superfund Accelerated Cleanup Model

Updated February 1998

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SUPERFUND ACCELERATED CLEANUP MODEL

CONTENTS

1. INTRODUCTION

The Superfund program has been both praised and criticized for how it addresses abandoned hazardous waste sites. One of the most effective parts of the program is the CERCLA statutory enforcement provisions that force polluters to pay. On the other hand, one of the major criticisms has been that site assessments, response actions, and enforcement have been costly and slow. In 1980, when CERCLA was enacted, Congress did not anticipate the number of uncontrolled hazardous waste sites that actually exist. With reauthorization in 1986, Congress amended CERCLA enhancing the response process, enforcement provisions, public participation provisions, and increasing the appropriations to 8.5 billion dollars to meet the needs of the program. Several factors that drove costs up at Superfund sites include extended site assessments with duplicative sampling efforts, litigation with potentially responsible parties (PRPs), and lengthy remedy selection analyses. These factors, as well as others, contribute to the public's perception that the Superfund program was inefficient. In April 1992, EPA responded to these shortcomings by introducing the Superfund Accelerated Cleanup Model (SACM). SACM streamlines the traditional Superfund response process that was established by Congress in CERCLA, as amended by SARA. SACM does not change the regulations for the traditional site evaluation process, but rather makes administrative changes to the traditional approach, while remaining consistent with existing response regulations outlined in the National Contingency Plan (NCP).

The main goals of SACM are:

- Non-duplicative site assessment
- Prompt risk reduction
- Cross-program coordination of response planning
- Early initiation of enforcement activities
- Early public notification and participation.

After successfully implementing the SACM process at several pilot sites, EPA announced its expectations to use SACM at all Superfund sites (OSWER Directive 9203.1-13).

In addition to SACM, EPA is developing other tools, such as presumptive remedies and response strategies, to speed up the response process. Presumptive remedies are used for sites with similar conditions and contamination. These presumptive remedies are technologies that have been selected repeatedly at a preponderance of certain types of Superfund sites. For instance, certain technologies have been consistently selected during the past decade for wood preserving facilities; therefore, instead of following a lengthy remedy selection process for each site, the lead agency may decide to examine just a few of the pre-designated presumptive remedies for wood preserving facilities. Presumptive response strategies are more

comprehensive than presumptive remedies in that they address all components of the response process, rather than just the remedy selection.

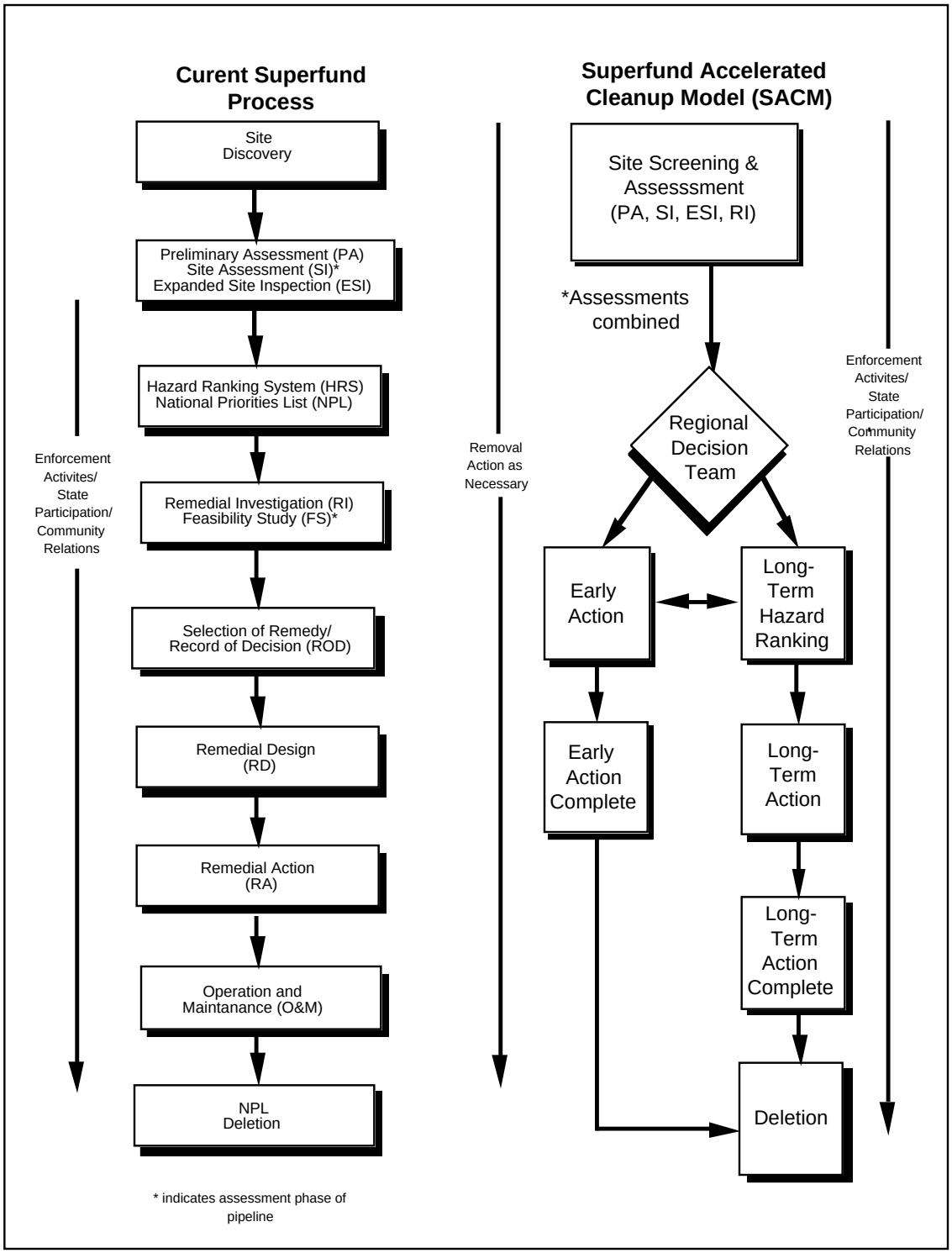
This module presents the primary aspects of SACM compared to the traditional Superfund response process. These two approaches to the Superfund response process are illustrated in Figure 1. In addition, this module discusses presumptive remedies by covering what they are, and providing an overview of the guidance EPA has developed.

After you have completed this module, you should be able to:

- Explain how SACM streamlines the traditional response process
- Be familiar with the terms of the response process as renamed by SACM
- Explain what presumptive remedies are and provide examples.

Use this list of objectives to check your knowledge after the training session on SACM and presumptive remedies.

Figure 1
THE TRADITIONAL SUPERFUND PROCESS VS. THE SACM PROCESS



2. ELEMENTS OF SACM

To streamline the traditional Superfund approach, SACM reorganizes and restructures various components of the response process. In particular, SACM integrates the numerous Superfund site assessments to create a single, more efficient evaluation. SACM also redefines the traditional removal and remedial actions as early actions and long-term actions, thereby achieving quicker risk reduction and a more effective, final site cleanup. EPA also continues to highlight rapid enforcement actions and a high level of public participation as an integral part of SACM. To oversee effective implementation of its new approach, SACM uses the expertise of Regional Decision Teams (RDTs). This section further describes these key aspects of SACM.

2.1 SITE ASSESSMENT

Prior to SACM, Superfund site evaluations followed a series of discrete, redundant steps. EPA often performed evaluations under the removal program (preliminary assessments (PAs), and site inspections (SIs)), and the remedial program (PAs, SIs, Hazard Ranking System scores (HRS), remedial investigations (RIs)) separately, without considering information gathered under preceding evaluations. Thus, each evaluation potentially required separate contracts, equipment, sampling teams, sampling strategies, and health and safety plans. This resulted in inefficient use of time and money that reflected negatively on the program in the eyes of both Congress and the public.

SACM accelerates the response process by integrating evaluations using both removal and remedial authority. Before beginning an assessment, EPA predicts the data needs based on the expected response. For example, if EPA believes the contamination is extensive enough to warrant a site's inclusion on the NPL, data can be collected simultaneously for the HRS (to determine if the site will be placed on the NPL) and for the RI/FS (to select an appropriate remedy). If possible, one continuous site evaluation with one report is conducted at each site (OSWER Directive 9203.1-03). For more guidance on site assessment and the SACM process, refer to Assessing Sites Under SACM — Interim Guidance (OSWER Directive 9203.1-05I).

The following fictional examples provide an illustration of the traditional site assessment versus the SACM integrated assessment.

Example 1a: Traditional Superfund Site Assessment:

EPA receives a public request to assess an old chemical manufacturing facility containing thousands of leaking barrels in an unlined lagoon. A contractor performs a removal PA and the site is placed in CERCLIS. The contractor then conducts a removal SI to determine the need for a removal. The SI confirms

that the soil and water are extremely contaminated, and EPA removes the barrels to minimize immediate threats. A year after completion of the removal, EPA initiates the remedial SI and begins to collect data for the HRS. The site is placed on the NPL and the RI/FS begins. Three years later, after completion of the RI/FS, remedy selection, and remedial design, EPA initiates the remedy. Five years have elapsed from discovery of the site to implementation of the remedy.

Example 1b: SACM Integrated Site Assessment:

EPA receives a public request to assess the same chemical manufacturing facility. After initial data gathering, the Agency believes the contamination will warrant the site's inclusion on the NPL. A contractor collects data to determine whether a removal action is necessary, to calculate the HRS score, and to select a remedy. The CERCLA and NCP requirements for the removal and remedial PA and SI, the HRS ranking, and the RI/FS are all met in a single site evaluation with a single report. The barrels are removed, the site is placed on the NPL, and the remedial action begins. Two and a half years have elapsed from the site's discovery to implementation of the remedy.

The integration of the various site evaluations under the two programs, and the anticipation of the site's NPL listing, reduced the cost and duration of the response by two and a half years.

2.2 EARLY AND LONG-TERM ACTIONS

Since CERCLA created only two response authorities, remedial and removal, two separate cleanup programs evolved. Because all Superfund cleanup actions are required to use one of these authorities, EPA placed all sites into one of the two programs and the programs operated separately. SACM, instead of directing sites under one of the removal or remedial programs, uses both authorities together to conduct early and long-term actions.

EARLY ACTIONS

The duration of an early action should generally be less than five years. The goal of an early action is to quickly reduce threats to human health and the environment. This may require that more than one early action be taken at some sites. An early action operates under either removal or remedial authority. Emergency removals, time-critical responses, and non-time-critical responses are early actions taken under removal authority. Early remedial actions are performed under remedial authority. Depending on the type of action, different statutory and regulatory requirements must be met for Fund-lead sites. For instance, except in special circumstances, removal authority can only be used for actions requiring less than 2 million dollars and 12 months. State assurances, a record of decision (ROD), and identification of applicable or relevant and appropriate requirements (ARARs) are required for early remedial actions, just as they are for traditional remedial actions. An early action

can occur in conjunction with a long-term action at a site. This is referred to as a "phased approach" and ensures a site is cleaned up as quickly and effectively as possible. Examples of early actions are given in Figure 2.

LONG-TERM ACTIONS

EPA expects long-term actions to take longer than five years to complete. They may occur at sites where high remedy implementation costs exist, or when long-term operation and maintenance activities (e.g., groundwater monitoring) are necessary. Long-term actions follow the NCP remedial process requirements, including NPL listing, a RI/FS, and a ROD. Examples of long-term actions are given in Figure 2. For more information on both early and long-term actions see Early Action and Long-term Action Under SACM -- Interim Guidance (OSWER Directive 9203.1-05I).

Figure 2
TYPES OF EARLY AND LONG-TERM ACTIONS

Early Action	Either	Long-Term Action
Access Restrictions	Source Remediation	Extensive Source Remediation
Source Removals	Capping/Containment	Groundwater Restoration
Source Containment	Relocation	Surface Water Restoration
Surface Structures	Source Extraction	
	Alternate Water Supply	
	Property Acquisition	
	Groundwater Plume Cleanup	
	Plume Containment	

The following fictional examples illustrate how early actions and long-term actions require less time and resources than traditional removal and remedial actions.

Example 2a: Traditional Response Process:

A work crew discovers a small (e.g., three-acre) abandoned landfill while constructing an apartment complex in a residential area where the community relies on groundwater as its primary source of drinking water. A removal PA/SI determines that, to reduce immediate threats, the contaminated soil must be excavated and removed. Further, to prevent contaminated groundwater from reaching nearby drinking water aquifers, the removal contractor installs three extraction wells. Later in the remedial SI, EPA personnel decide to collect data for an HRS score, as well as for the RI/FS to select a long-term remedy. As part of this remedy, a second contractor excavates an additional, deeper layer of soil to eliminate the source of contamination. During the RI, EPA determines that the extraction wells installed under the removal program did not meet all ARARs, and were not situated to extract the entire plume of contaminated groundwater. The remedial contractor therefore installs four more wells, for a total of seven.

The contaminated groundwater plume is extracted and treated and the aquifer is returned to its beneficial use.

Example 2b: SACM Process:

At the same site, an integrated site assessment provides HRS and RI/FS data, and helps EPA determine that it must remove the surface layer of contaminated soil under time-critical authority, and a deeper layer of contaminated soil with an early remedial action. One contractor simultaneously removes both of these layers. Also, as a removal action, the contractor drills three extraction wells to protect the drinking water sources. The wells meet all ARARs and are strategically placed such that only one more well is needed for the long-term remedial action. These four wells extract the contaminated groundwater plume, and the aquifer returns to its beneficial use.

In this scenario, EPA used removal and remedial authorities together to consolidate steps in the cleanup process and provide an equal measure of protection and remediation. A more efficient remedial design saved time and money.

2.3 ENFORCEMENT

SACM continues to emphasize EPA's "enforcement first" policy. Thus, EPA must initiate potentially responsible party (PRP) searches and negotiations as early as possible. However, because response actions under SACM may begin sooner, there is a greater need to expedite PRP searches so that response actions may begin. To preserve valuable resources, Regions must be careful to expedite PRP searches only at sites that may need a remedial response. Thus, the timing of searches is very important, and EPA must have a clear strategy to conduct PRP searches.

In order to conduct PRP searches more quickly, SACM encourages the use of a phased PRP search that focuses on establishing the liability of, and negotiating with, those PRPs who are easily found. Once EPA identifies the core group of PRPs, the PRPs can lead the response, with EPA oversight. Involvement with PRPs whose liability is too costly or time-consuming (e.g., extensive litigation is necessary) to establish may be delayed until after initiation of the response action.

2.4 PUBLIC PARTICIPATION

EPA's experience has shown that early and frequent communication with local communities can enhance a site response; this is particularly true under SACM. Because SACM is a new and unfamiliar approach to cleanup, public outreach and education are crucial to obtaining public support. EPA must continue to involve the public as early as possible throughout all stages of the response process. Integrated site assessments and early actions, however, may have community involvement requirements that differ from traditional requirements. For example, because the NCP requires that the administrative record be made available when the RI/FS begins, a site undergoing a combined SI/RI/FS will require earlier establishment of an administrative record.

2.5 REGIONAL DECISION TEAMS

If SACM is to successfully decrease the time and money spent under the Superfund program, a creative and informed approach is needed for each site. To ensure solid decisions are made, an experienced and knowledgeable team of experts, typically called a Regional Decision Team (RDT), has been formed in many of the Regions. The goals of the RDT are effective coordination, communication, and integration of program authority, expertise, and resources to implement wise and consistent decisions at Superfund sites.

Regions have flexibility both in establishing and selecting the members of the RDT. Some Regions may have more than one team while some may not establish a RDT as a method to implement SACM. Members may include state officials, on-scene-coordinators (OSCs), remedial project managers (RPMs), community involvement coordinators, and site and risk assessors. Once selected, the RDT develops rules that apply to all sites in the Region including criteria for selecting response actions and PRP search methods. Strategies for communicating with Headquarters, states, and support agencies, such as the Department of Justice, are created, and a plan for integrating site evaluations is formed.

Although the day-to-day operations of each site remain the responsibility of the site managers, the RDT can play a major role in site-specific decisions. The Team prioritizes sites in the Region by addressing the worst sites first, and decides how early and long-term actions should be used at each site. The RDT may provide policy and strategic direction to site managers, sign RODs or action memoranda, and determine which sites are of NPL caliber so the RI/FS can be included in the integrated site assessment. In addition, the RDT ensures that response actions are fully consistent with the requirements contained in CERCLA and the NCP. For more information on SACM's RDT mechanism see SACM Regional Decision Teams -- Interim Guidance (OSWER Directive 9203.1-05I)

3. PRESUMPTIVE REMEDIES AND RESPONSE STRATEGIES

Presumptive remedies are a key component of SACM. They represent a way to streamline remedy selection based on experience at certain types of sites. Before SACM, EPA presumed that each site on the NPL was unique and required a site-specific review of remedial alternatives. EPA has now learned from experience that many sites have similar contaminated media, types of wastes, or historical industrial practices, and as a result, will most likely require use of similar technologies in the remedy. By adopting technologies consistently selected at the majority of similar sites, presumptive remedies ensure that a site is cleaned up faster, while still remaining consistent with the NCP's intent of protecting human health and the environment. Also, since the Agency anticipates using presumptive remedies at appropriate sites, remedy selection is expected to be generally more consistent across the nation.

EPA identified several categories of sites where presumptive remedies are appropriate: municipal solid waste landfills (MSWLFs); sites with volatile organic compounds (VOCs) in soils, sediments, and sludges; and woodtreater sites. Presumptive remedy guidance exists for all of these types of sites and is under development for sites with metal contamination.

For certain types of sites or contaminants, EPA believes a broader approach, a "comprehensive response strategy," is more appropriate. To date, only a presumptive *response* strategy for sites with groundwater has been developed. EPA is currently contemplating a comprehensive response strategy for manufactured gas plant (MGP) sites. The discussion below provides details of existing and future presumptive remedies.

MUNICIPAL SOLID WASTE LANDFILLS

In September 1993, EPA selected a presumptive remedy for MSWLFs, which constitute approximately 20 percent of all NPL sites (OSWER Directive 9355.3-18FS). Because treatment is usually impracticable at such sites, the presumptive remedy is a containment remedy which includes the following components as appropriate on a site-specific basis: capping to contain the contamination, collection and treatment of the gas and leachate, containment of the contaminated groundwater plume, and the use of institutional controls to supplement engineering controls. Since all of these actions are demonstrated methods of reducing the risk at MSWLFs, they are now a part of a multi-component presumptive remedy for MSWLFs.

The containment presumptive remedy also takes into account the possibility that hot spots, e.g., drums containing principal threat wastes, may need to be addressed. EPA decides whether the combination of the waste's physical and chemical characteristics and volume is such that the integrity of the new containment system will be threatened if the waste is left in place. If so, the hot spot may need to be

treated or excavated prior to construction of the landfill cap. This presumptive remedy does not address exposure pathways outside the landfill, and does not provide a long-term remedy for groundwater restoration. More guidance on the presumptive remedy for municipal waste landfills is found in Presumptive Remedy for CERCLA Municipal Waste Landfill Sites (OSWER Directive 9355.0-49FS).

SITES WITH VOCs IN SOILS

Over the years, EPA conducted numerous remedial actions at sites with VOC contamination. This wealth of experience allowed EPA in September 1993, to identify three preferred technologies based on a comprehensive ROD analysis. These treatment methods - soil vapor extraction, thermal desorption, and incineration of the contaminated soil - comprise the presumptive remedy for sites with VOC contamination. The first remedy, soil vapor extraction, removes VOCs by passing air through the soil. Thermal desorption heats the soil until the VOCs are vaporized and collected for treatment. Incineration decomposes VOCs at high temperatures. Except under unusual circumstances, one of these remedies should be used at a site with VOC contamination. More information on this presumptive remedy is found in Presumptive Remedies: Site Characterization and Technology Selection for CERCLA Sites with Volatile Organic Compounds in Soils (OSWER Directive 9355.0-48FS).

WOOD TREATER SITES

As EPA gained experience at sites contaminated by wood treatment processes, four treatment technologies emerged as the most frequently selected. The Agency selected these technologies as the presumptive remedies for wood treater sites in December 1995. Three of the technologies are for treatment of organic contaminants, and one is for treatment of inorganic contaminants. If organic contaminants are present at the site, bioremediation, which is the chemical degradation of organic contaminants using microorganisms, is the primary remedy. Thermal desorption or incineration are also options for treatment of organic contaminants. The presumptive remedy for wood treater sites with inorganic contamination is immobilization. Immobilization traps the chemical in place, either by solidifying it (e.g., with a cement), or stabilizing it (i.e., chemically binding it to its surroundings). Sites with both organic and inorganic contamination use a series of organic and inorganic treatments called a treatment train. For more guidance on wood treater sites, see Presumptive Remedies for Soils, Sediments, and Sludges at Wood Treater Sites (OSWER Directive 9200.5-162).

GROUNDWATER CONTAMINATION

Initially, EPA did not anticipate the extent and types of groundwater contamination, nor the complexity of subsurface conditions found at Superfund sites. Since approximately 85 percent of Superfund sites have contaminated groundwater, EPA decided it necessary to create a remedy selection guidance. Because of the complexity

of these sites, there is no single technology that is appropriate for all sites with groundwater contamination. Therefore, in October 1996, EPA created a presumptive *response strategy* instead of a presumptive *remedy*. Because it is difficult and time-consuming to fully characterize the subsurface nature of a site, a recurring problem at groundwater contaminated sites was that remedies were selected without sufficient data. Thus, a major part of the presumptive strategy is the phased approach, which allows data collected from initial assessment phases to be used to further characterize the site. Thus, the remedy is selected using more accurate and complete information. EPA also outlined methods for deferring the selection of, or refining, a remedy after the ROD is signed. Finally, the Agency selected several presumptive technologies for treatment of extracted groundwater. See Presumptive Response Strategy and Ex-Situ Treatment Technologies For Contaminated Ground Water at CERCLA Sites (OSWER Directive 9283.1-12) for more guidance.

FUTURE PRESUMPTIVE REMEDIES AND RESPONSE STRATEGIES

Only the metals in soils presumptive remedy remains to be completed. EPA considered developing additional presumptive remedies, including one for sites with PCB contamination, but found remedies for those other categories of sites already stipulated through other program regulations; thus no new presumptive remedies are currently anticipated. The current focus for this initiative is on appropriately using existing presumptive remedies. EPA's Technology Innovation Office is currently developing a presumptive response strategy for manufactured gas plant sites.

4. MODULE SUMMARY

EPA created SACM to reduce the time and money spent at Superfund sites, while continuing to protect human health and the environment. Instead of conducting a series of separate site assessments, SACM integrates them into one continuous site assessment with one report, if possible. Also, where EPA once categorized all actions as either remedial or removal, the Agency now conducts early and long-term actions using either authority. This allows for earlier remedial actions and earlier risk reduction. EPA continues to use an enforcement first policy, and attempts to begin enforcement procedures as soon as possible under SACM. Public perception of SACM is a high priority, thus the involvement of the public at all stages of the response is absolutely necessary.

The SACM process is coordinated by RDTs comprised of EPA and state personnel experienced in early and long-term actions, site assessment, enforcement, and community relations.

The presumptive remedy initiative under SACM promotes the use of cleanup technologies historically shown to be effective at similar types of sites. To date, EPA has published presumptive remedies for municipal landfills, sites with VOC contamination, and wood treater sites, as well as a presumptive response strategy for groundwater contamination.