



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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OFFICE OF
SOLID WASTE AND EMERGENCY RESPONSE

MEMORANDUM

SUBJECT: Report on Integrating Removal and Remedial Assessment

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TO: Site Assessment Section Chiefs,
Removal Managers,
Regions I - X

Enclosed is the report titled "Integrating Removal and Remedial Assessments Under the Superfund Accelerated Cleanup Model."

The report describes removal assessment and remedial site assessment in various Regions and focuses on issues involved in integrating these activities. The study covers data collection, sampling, and analytical requirements of screening assessments. It also examines the site evaluation process from site discovery to evaluation of criteria for a removal action or proposal to the National Priorities List (NPL).

The report was developed in order to establish a baseline of current approaches to removal and remedial assessment activities and address the application of these approaches under the Superfund Accelerated Cleanup Model. It was also developed to further cross-program understanding between the removal and remedial programs. The report should be used as a reference in developing integrated assessments.

Attachment

**INTEGRATING REMOVAL AND REMEDIAL
ASSESSMENTS UNDER THE
SUPERFUND ACCELERATED CLEANUP MODEL**

June 1993

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1.0 INTRODUCTION

This study examines data collection, sampling, and analytical requirements of screening assessments currently performed by the Superfund removal and remedial programs. It reviews the site evaluation process from site discovery through evaluation of criteria for a removal action or proposal to the National Priorities List (NPL). It also examines Regional assessment practices, including how removal program data can support remedial site assessment objectives, and vice versa. The study compares and contrasts selected elements of the Superfund removal and remedial programs, focusing on issues involved in integrating assessment activities under the Superfund Accelerated Cleanup Model (SACM).

SACM streamlines and accelerates the Superfund program. SACM is designed to deliver quicker results, including reduction of immediate health risks at all sites and restoration of the environment over the long term.

SACM integrates removal and remedial actions where appropriate, while maintaining separate legal authorities for the two programs, whose specific applications at Superfund sites will be different but complementary (OSWER Directive 9203.1-01, April 7, 1992). For example, instead of separate removal and remedial preliminary assessments (PAs), EPA can perform a combined remedial and removal assessment at the beginning of the site evaluation process. A Regional Decision Team (RDT) will review assessment results to decide whether early action is needed to reduce immediate risk to the public and the environment and whether long-term cleanup should be initiated to restore the environment. Enforcement, community relations, and public participation activities will occur throughout the process. With SACM, EPA can achieve immediate risk reduction at a greater number of sites, conduct clean-up efforts more efficiently, prioritize resources to fund more cleanups, and eliminate redundant assessment activities.

To support SACM implementation, this study describes the site assessment stages of the removal and remedial programs under current guidelines to evaluate the potential for integrating activities. The study reviewed national and Regional guidance documents to identify field data objectives common to both programs, assessment information and sample analysis requirements, and field practices. The study also reviewed program-specific training and qualifications requirements, examined a small sample of removal and remedial assessment reports, and surveyed Regional removal program personnel to determine if activities under one program satisfied requirements of the other.

The results of the study support the concept that SACM implementation would increase efficiency and accelerate the Superfund process within the framework of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), while ensuring that cleanups continue to be protective and allow for appropriate public involvement.

The NCP (40 CFR Part 300) allows for the coordination of combined site screening assessments. Section 400.315(c) of the NCP states, "Removal actions shall, to the extent

practicable, contribute to the efficient performance of any anticipated long-term remedial action with respect to the release concerned," setting the regulatory framework for increased coordination between the removal and remedial programs. Screening assessment activities lend themselves to program integration, since these activities vary little between the removal and remedial programs.

2.0 STATUTORY FRAMEWORK AND REGULATORY DEFINITIONS

Section 105 of CERCLA, as amended by the Superfund Amendments and Reauthorization Act (SARA) and section 311 (c)(2) of the Clean Water Act (CWA), required development of the NCP to specify the statutory requirements to implement Superfund. NCP Subpart E—Hazardous Substances Response (section 300.400) addresses site evaluations from discovery or notification through cleanup:

- (a) This subpart establishes methods and criteria for determining the appropriate extent of response authorized by CERCLA: (1) When there is a release of a hazardous substance into the environment; or (2) When there is a release into the environment of any pollutant or contaminant that may present an imminent and substantial danger to the public health or welfare.

The Office of Solid Waste and Emergency Response (OSWER) and the Office of General Counsel (OGC) determined that the NCP offers adequate flexibility to deal with different types of clean-up actions as proposed by SACM. No statutory changes will be made to accommodate SACM, and SACM does not provide independent authority to perform actions not authorized by CERCLA and the NCP. Any action taken under SACM must still fall into the category of either a removal or remedial action (OSWER Directive 9203.1-03, July 7, 1992).

Figure 1 shows traditional removal and remedial assessment activities prior to SACM. The diagrams do not indicate time schedules. Removal assessments determine the need and type of short-term or emergency response actions to protect human health and the environment, while remedial activities address long-term remediation.

2.1 Notification and Discovery

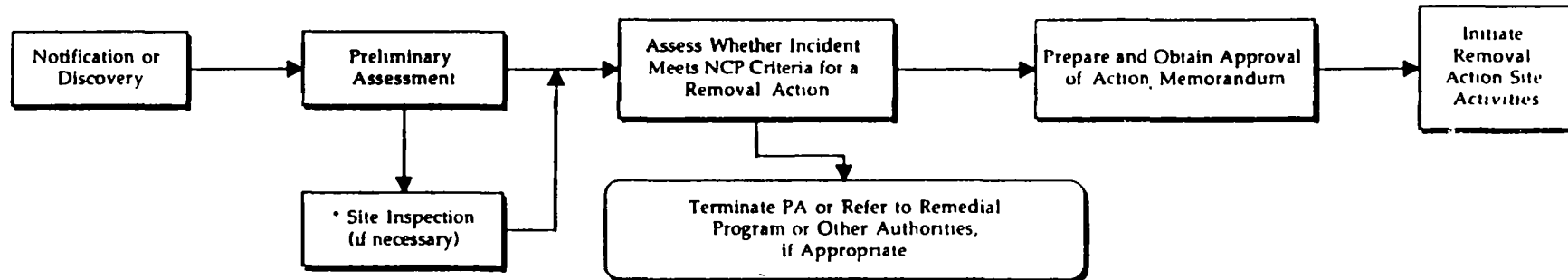
NCP section 300.405 describes the most common ways EPA learns of releases, including CERCLA sections 103(a) (reportable quantities) and 103(c) (notification of the transport, storage, and disposal of hazardous substances) reports, government investigation, notification by a permit holder, government or public inventories, citizen petitions, federal facility requests, and reports to the National Response Center (NRC).

The NRC, established by the CWA and operated by the U.S. Coast Guard (USCG), is the U.S. government's 24-hour emergency notification center. When hazardous waste releases and oil spills are reported by telephone, the NRC collects the information, including the location of the release, estimated quantity of material released, party responsible for release, possible source of release, and date and time of the release. The NRC then promptly notifies the appropriate EPA Regional office or USCG district for releases to navigable waters.

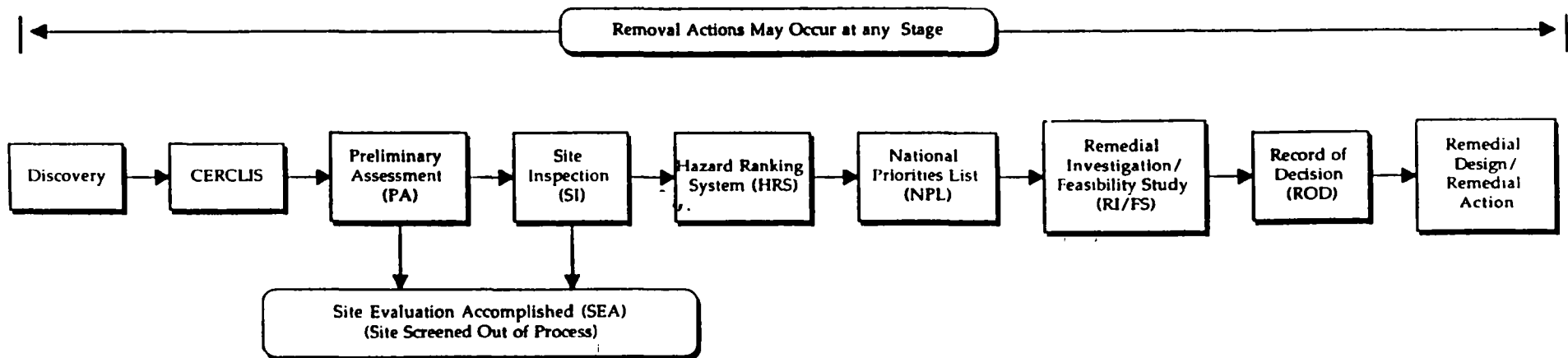
When EPA receives notifications to Superfund other than through the NRC, it refers them to either the removal or the remedial program. Current Regional referral practices vary and no national guidance exists. To eliminate this variable referral, SACM

FIGURE 1: TRADITIONAL ASSESSMENT PROCESSES

REMOVAL PROGRAM



REMEDIAL PROGRAM



proposes that all discoveries be routed and tracked through "one door," with the NRC continuing as a 24-hour notification mechanism for emergencies.

To report a non-emergency abandoned waste site or another type of potential release, citizens may use the remedial program's PA petition (OERR Publication 9200.5-301FS) to notify EPA and thereby trigger a CERCLA site discovery. The remedial program adds the site to its inventory and schedules the assessment within 12 months of notification. If at any time the remedial program identifies a possible need for emergency response or potential removal action, it promptly notifies the removal program for timely coordination.

2.2 Removal and Remedial Assessment Objectives

Table 1 gives an overview of common removal and remedial assessment objectives. The goal of a removal assessment is to determine hazard conditions at a site and whether those conditions meet the NCP criteria for a removal action. Generally, the most critical aspect is to identify immediate threats to the population and the environment by establishing whether hazardous substances are present on site and the potential for their release.

The goal of remedial site assessments is to identify the highest priority sites for long-term remediation. The Hazard Ranking System (HRS) specifies criteria to be used during remedial assessments to identify these sites.

2.2.1 Preliminary Assessment

Both the removal and remedial programs conduct a PA to determine appropriate Superfund response actions. The PA identifies hazardous substance releases and human and environmental populations that might be affected by a site. If a PA concludes that the site warrants further investigation to evaluate clean-up options, a site inspection (SI) follows in both programs.

Removal program practices vary Regionally. Most Regions perform removal assessments of variable scope incorporating both PA and SI components. The primary removal assessment objective is to determine the need for and urgency of a removal action. At any release where the EPA On-Scene Coordinator (OSC) determines there is a threat to public health, welfare, or the environment, the OSC may take actions to abate, minimize, stabilize, mitigate, or eliminate the threat. Site assessment activities in the remedial program—previously known as "pre-remedial" activities—include PAs as specified in the NCP for every site in CERCLIS (the CERCLA information system inventory of uncontrolled hazardous waste sites). Remedial site assessments characterize threats posed by sites and identify the nation's highest long-term remediation priorities. The primary objective of remedial site assessments is to collect data to evaluate sites according to the HRS and identify those that should be on the NPL for long-term remediation.

Table 1
Removal and Remedial Assessment Objectives

Objective	Removal	Remedial
Determine need for further action; screen out sites that pose no significant threat; refer sites to another program	X	X
Set priority for sampling inspection	X	X
Establish priorities among sites	X	X
Collect data to evaluate NPL eligibility		X
Identify presence and immediacy of threat	X	X
Characterize site for more effective and rapid initiation of RI/FS or response under other authority	X	X
Specify whether site meets criteria for a removal action	X	

Following the remedial PA, an EPA site assessment manager (SAM) determines whether the site evaluation is accomplished (SEA) or whether there is a need for an SI (which may be conducted in stages). A SEA recommendation drops the site from further federal Superfund consideration unless new information becomes available. For sites that are screened from further evaluation, EPA provides information to states or other regulatory authorities which may take action on their own.

SACM's single, continuous assessment begins with an initial screening assessment (as required by the NCP), which combines the objectives of a removal assessment and a remedial PA.

Removal Preliminary Assessment

Section 300.410(b) of the NCP requires that a preliminary assessment for possible removal action be undertaken by the lead agency as promptly as possible. For EPA-lead sites, the OSC is responsible for conducting the assessment to determine the need for a removal action. Removal site evaluation, in accordance with the NCP, consists of a removal PA and, if warranted, a removal SI. Objectives of the removal PA are to determine the presence of a threat, the immediacy of the threat, and proper referral of the threat to the remedial program.

NCP section 300.410 specifies that the removal PA collect and evaluate readily available information, including but not limited to:

- Identification of the source and nature of the release or threat of release
- Evaluation by the Agency for Toxic Substances and Disease Registry (ATSDR) or by other groups (e.g., state public health agencies) of the threat to public health
- Evaluation of the magnitude of the threat
- Evaluation of factors necessary to make the determination of whether a removal is necessary
- Determination of whether a nonfederal party is undertaking proper response

The PA may take only a few hours or up to several weeks, depending on characteristics of the release. PAs for emergency situations rely primarily on existing information and perhaps a few samples. When characteristics of the incident require longer analysis and evaluation, the removal PA may include more extensive sampling and monitoring and review of other site data, such as historical management practices, information from on-site generators, photodocumentation, and personal interviews (*Superfund Removal Procedures*, OSWER Directive 9360.0-03B, 1988).

The OSC incorporates EPA-established special procedures or technical criteria for complex cases, including evacuation and relocation; contamination of drinking water, structures and private residences, floodplains, wetlands, and Native American lands; and contamination due to radioactive wastes and naturally occurring substances. If the situation indicates response actions are necessary, the OSC conducts a potentially responsible party (PRP) search to identify and compel legally responsible parties to take corrective action.

Section 300.410 (e) of the NCP provides that a PA shall, as appropriate, be terminated when the OSC or lead agency determines: (1) there is no release or threat of release; (2) the source is neither a vessel nor a facility as defined by section 300.5 of the NCP; (3) the release involves neither a hazardous substance nor a pollutant or contaminant that may present an imminent and substantial danger to public health or welfare; (4) the release consists of a situation specified in section 300.400 (b) (1) through (3) (naturally occurring substances) subject to limitations on response; (5) the amount, quantity, and concentration released does not warrant federal response; (6) a party responsible for the release, or any other person, is providing appropriate response, and on-scene monitoring by the government is not required; or (7) the assessment is completed.

If remedial actions under section 300.430 are indicated, the OSC refers the incident, together with all removal assessment information, to remedial response personnel for site evaluation pursuant to NCP section 300.420. OSC documentation and notification requirements ensure that removal assessment conclusions are in the administrative record and that trustees of any affected natural resources are notified so that they may initiate appropriate actions pursuant to subpart G of Part 300 of the NCP. OSCs are

encouraged to submit pollution reports (POLREPs) which also document PAs that do not require a removal action.

Remedial Preliminary Assessment

The remedial program must perform a PA within 12 months of site discovery and entry into CERCLIS. If discovery is by direct referral from the removal program or other notifying reports indicating the site is a critical threat, the remedial program schedules a PA as soon as possible.

The remedial PA is a screening assessment that distinguishes sites that pose little or no potential threat to human health and the environment from sites that may pose a significant threat and warrant further investigation. Under SACM, PA results can provide to the RDT early indications of the type of response actions needed to clean up the site. The PA also fulfills public information needs and supports emergency response and removal activities. Section 300.420 of the NCP states that the lead agency shall perform a remedial PA on all sites in CERCLIS, as defined in section 300.5, to:

- Eliminate from further consideration those sites that pose no threat to public health or the environment
- Determine if there is any potential need for removal action
- Set priorities for site inspections
- Gather existing data to facilitate later evaluation of the release pursuant to the HRS, if warranted

The PA is a compilation of readily available information about the site and its surroundings. It identifies populations and other targets that might be affected by the site. It includes a reconnaissance of the site and its surrounding environment but does not include sampling. The PA examines key HRS factors that can indicate a preliminary HRS score greater than the minimum score for NPL eligibility and that can be evaluated within the investigation's limited scope. Most (approximately 55 percent) of the 120 hours allocated for the remedial PA are expended collecting data; preparing the report requires approximately 20 percent of the allocated time (see *Guidance for Performing Preliminary Assessments Under CERCLA*, OSWER Directive 9345.0-01A, 1991). The remedial PA reconnaissance (12 percent of the PA effort) duplicates many activities of the removal assessment site visit. Therefore, a combined site reconnaissance under SACM represents potential time savings.

The PA provides information on:

- Historical waste generation and disposal practices
- Hazardous substances associated with the site
- Potential sources of hazardous substances
- Important migration pathways and affected media

- A comprehensive survey of targets
- Critical sample locations for the SI

Data important to the HRS evaluation may not be available during the PA—for example, analytical data indicating hazardous substance releases and targets exposed to actual contamination. For these factors, the PA investigator exercises professional judgment applied in a reasonable and consistent manner to form hypotheses regarding the likelihood of release of hazardous substances and their migration to targets. Some integrated assessments would warrant collecting critical samples—as in the scope of a focused SI—to obtain information about the severity of the threats posed by the site (see *Guidance for Performing Site Inspections Under CERCLA*, OSWER Directive 9345.1-05, 1992).

The removal and remedial programs perform similar PAs that differ mainly in the extent to which potential releases and targets are researched and reported. The removal PA does not investigate all the HRS elements addressed by the remedial PA. Still, significant duplication of effort between programs occurs at this assessment stage.

2.2.2 Site Inspection

The SI is the first investigation to collect and analyze wastes and environmental media samples to support site evaluation. The SI supports potential removal and enforcement actions, collects additional data to evaluate sites using the HRS, or supports remedial investigations or response actions under other authorities.

In the removal assessment process, Regional practices generally do not formally distinguish a removal SI. Removal preliminary assessments include samples the OSC determines are necessary to establish threat. In contrast, the remedial site assessment SI is a discrete sampling investigation to determine releases and actual contamination under the HRS. For sites that are clearly serious threats, SAMs in some Regions may decide to combine SI sampling and analysis activities with the remedial PA.

Removal Site Inspection

OSCs perform a removal SI (NCP section 300.410 (d)) when additional information is needed to make a removal action decision. Completion of the PA is not necessary to begin a removal SI, and an SI is not required for a site to continue through the removal decision process.

A removal SI includes an off-site perimeter or on-site inspection. The removal program documents site evaluation results in a removal assessment report. If the removal site evaluation concludes that a removal action is not warranted, but that remedial action may be necessary, the OSC refers the site to the remedial program for evaluation pursuant to NCP section 300.420.

Remedial Site Inspection

The remedial program performs an SI if a site poses a significant threat indicating the need for long-term remediation, or questions requiring a sampling investigation remain after the PA. The SI supplements PA data through sampling and analysis. NCP section 300.420 (c) describes the remedial SI as an on- and off-site investigation to:

- Eliminate from further consideration those releases that pose no significant threat to public health or the environment
- Determine the potential need for removal action
- Collect or develop additional data, as appropriate, to evaluate the release pursuant to the HRS
- Collect data in addition to those required to score the release pursuant to the HRS, as appropriate, to better characterize the release for more effective and rapid initiation of the Remedial Investigation/Feasibility Study (RI/FS) or response under other authorities

The SI produces a site-specific sampling plan addressing sampling goals, data quality objectives, and quality assurance/quality control (QA/QC) issues, and a report describing waste handling at the site, hazardous substances, migration pathways, human and environmental targets, and recommendations regarding further action. SI preparation also requires a work plan, a health and safety plan, and an investigation-derived wastes plan.

Remedial SIs consist of four major activities: (1) review the available information, including analytical data; (2) organize the project team and develop SI plans; (3) perform field work to visually inspect the site and collect samples; and (4) evaluate all data and prepare the SI report. For some sites, the SI may involve additional tasks to help meet SI objectives and support HRS data requirements and emergency response and remedial efforts. Specifically, the remedial SI investigates:

- Release and migration (or threatened release) of a hazardous substance to drinking water wells or intakes
- Release and migration of a hazardous substance to surface water sensitive environments or fisheries
- Presence of a hazardous substance on residential, school, or day care properties or terrestrial sensitive environments
- Release of a hazardous substance into the air

Often the scope of an SI can be limited to sampling to test PA hypotheses to confirm whether the site has a reasonable chance for placement on the NPL (see *Guidance for*

Performing Site Inspections Under CERCLA, 1992). A few strategically located samples may indicate that no further action needs to be planned, and collecting all information needed for NPL documentation is unnecessary; in this situation the SI investigator performs a focused SI. Under SACM, it is likely that combining focused SI activities in the initial screening assessment will increase efficiency of the assessment process.

At other sites, the scope of the SI can be expanded to fully characterize the threats because source, release, and target contamination are known during the PA from previous data, and screening samples are not necessary. An "expanded" SI is reserved for sites that appear to qualify for the NPL.

The focused SI typically requires 12 to 20 samples (an average of 15) to investigate PA hypotheses of target contamination and to identify hazardous substances. The number of hypotheses and critical questions remaining after the PA and the number of pathways contributing to the further action recommendation influence the scope of the focused SI. On average, the focused SI requires 350 to 450 technical hours, most of which are spent preparing for the sampling visit and collecting samples in the field.

The objective of the expanded SI is to collect all data necessary to prepare an HRS scoring package to propose the site to the NPL. The HRS evaluation and documentation process requires samples to attribute hazardous substances to site operations, establish representative background levels, and obtain any missing HRS data to document pathways of concern. The expanded SI may require special field activities beyond the screening scope of the focused SI. Special activities may include monitoring well installation, air sampling, geophysical studies, borehole installation, and complex background sampling studies.

The expanded SI typically requires 25 to 35 samples (an average of 30) and 600 to 650 technical hours. The complexity of the site and the need for special procedures determine the scope of the investigation and whether additional technical hours are required.

At the end of the SI, EPA Regional and state officials decide whether the site should undergo further investigation (resulting in possible NPL placement and remediation) or be removed from further Superfund consideration.

2.3 Superfund Response Actions

Superfund seeks to address the threats to human health and the environment caused by uncontrolled hazardous substance releases. This is accomplished by stabilization and cleanup in two ways: removal actions and remedial actions. The urgency and extent of the threat, as well as the scope of the response action, determine whether a removal or remedial action is needed. Removal actions address emergencies and imminent threats, are simpler in scope and of shorter duration than remedial actions, and are limited to a cost of \$2 million (with special exemptions). Remedial actions address long-term threats, are complicated and diverse in scope, and are of long duration.

2.3.1 Removal Action

NCP section 300.415 specifies that the following criteria be considered in determining the appropriateness of a removal action at NPL and non-NPL sites:

- Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants
- Actual or potential contamination of drinking water supplies or sensitive ecosystems
- Hazardous substances or pollutants or contaminants in drums, barrels, tanks, or other bulk storage containers that may pose a threat of release
- High levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface, that may migrate
- Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released
- Threat of fire or explosion
- The availability of other appropriate federal or state response mechanisms to respond to the release
- Other situations or factors that may pose threats to public health or welfare or the environment

Whenever a planning period of at least six months exists before field activities begin, and the lead agency determines that a removal action is appropriate, the lead agency shall (a) conduct an Engineering Evaluation/Cost Analysis (EE/CA) of the site, and (b) complete a sampling plan and quality assurance project plan, if environmental samples are necessary to evaluate removal action alternatives. OSCs have emergency authority to initiate activities under \$50,000 prior to administrative approval.

Removal actions maintain statutory limits of \$2 million in cost and 12 months in duration from the start of on-site activities to completion. An exemption to the statutory limits may be granted under CERCLA section 104(c) when the Agency determines that: there is an immediate risk to public health or welfare or the environment, and continued response is required to prevent an emergency where no other timely assistance is available (the "emergency" waiver); or a continued response is appropriate and consistent with a proposed remedial action (the "consistency" waiver). Section 300.415 of the NCP places the following conditions on removal actions, which necessitate an association between the removal and the remedial programs:

- (c) Removal actions shall, to the extent practicable, contribute to the efficient performance of any anticipated long-term remedial action with respect to the release concerned.
- (f) If the lead agency determines that the removal action will not fully address the threat posed by the release and the release may require remedial action, the lead agency shall ensure an orderly transition from removal to remedial response activities.

2.3.2 Remedial Action

Remedial site assessments identify the site as a possible NPL candidate or designate it SEA and remove it from further Superfund consideration (it may be referred to another agency such as the state). For NPL candidate sites, EPA begins preparing an HRS package, applying results of the remedial SI. NPL-candidate designation identifies the site for potential long-term remediation. Once a site is included on the NPL, a remedy selection process (in accordance with NCP section 300.430) begins to implement remedies that eliminate, reduce, or control risks to human health and the environment. This is accomplished through performance of an RI/FS and preparation of a Record of Decision (ROD) for the remedial action. Under SACM, the RDT will decide the most appropriate response action. The designation of early or long-term action distinguishes short-term prompt risk reduction activities from long-term restoration of surface and ground water resources.

3.0 COMPARISON OF ASSESSMENT ACTIVITIES

This section compares technical aspects of the removal and remedial programs, from statutory requirements to Regional implementation practices. It discusses cross-program referral; sampling decisions; comparison of activities based on guidance, Regional documents, and assessment reports; event tracking; and personnel requirements.

3.1 Cross-Program Site Referral

The removal program is notified of numerous accidents, explosions, fires, spills, and other conditions capable of releasing hazardous substances to the environment—up to 20,000 notifications per year, of which a small number (perhaps 1 percent) require emergency removal actions, and an even smaller number (perhaps 0.5 percent) require work to assess appropriate remedial action. The number of "discovered" remedial sites referred for removal assessment varies but may average 200 to 300 annually. The exact amount of overlap between assessment sites in the removal and remedial universes is difficult to quantify, because current practice does not require recording sites referred for assessment between Superfund's programs. SACM's integrated assessment will be an efficient process for those sites that remain under Superfund's removal and remedial clean-up authority.

A study completed in March 1992 (Booz, Allen and Hamilton, Inc.) addressed programmatic and administrative integration issues, with a focus on communication and the referral of sites across programs. The study provided preliminary findings from the Regions and recommended further study of cross-program referrals and communication.

The study found that communication/ and coordination between removal and remedial programs are critical in eliminating duplication of effort. Interviews with Regional removal and remedial assessment personnel indicated that communication problems exist within Regions, and that more direct sharing of information and coordination of activities are necessary.

The study discovered that successful coordination of the two programs is affected by several key issues, including:

- Removal and remedial assessment personnel are usually organized in different branches or sections, and are located on different floors, in separate buildings, or different localities.
- Different program perceptions may affect the regular transfer of information between programs. For example, if the removal program determines a site does not require remedial work, the remedial program might not be notified of the decision.

The study found that problems resulting from the lack of cross-program coordination include:

- Duplication of effort exists between the programs.
- Workload planning is affected when the removal program investigates a CERCLIS site without notifying the remedial program, or when the remedial program refers a site for a removal assessment.
- When the removal program decides not to perform a removal action after a removal assessment, the site information is not always provided to the remedial program.
- Nearby residents may be contacted by different EPA groups unaware that another program is working on the same site, resulting in a public perception of Superfund inefficiency.

Many SACM concepts place an increased emphasis on cross-program communication and coordination. SACM strives to address problems inherent in referring sites between Superfund assessment authorities. A benefit of improving the sharing of information between programs is achieving earlier risk reduction at worst sites first.

The above study found that in Regions that currently routinely refer sites between removal and remedial assessments, communication mechanisms in place include spreadsheet printouts, specific referral forms, memoranda, and verbal notifications. In two Regions, program interactions are infrequent, but there has been some coordination; in one, formal meetings are held twice a year. Two Regions have established formal and informal communication procedures. In one Region, program team leaders meet at least twice a week.

Incomplete information regarding the incidence of referring sites to the other program includes (Regions coded for anonymity):

- Region C—The remedial site assessment program refers 20 to 30 sites per year to the removal program; the removal program refers fewer than 10 sites per year to remedial site assessment.
- Region D—30 to 50 of the 102 sites in the removal program's annual assessment inventory were referred by the remedial site assessment program; the removal program refers about 10 sites per year to remedial site assessment.
- Region E—The remedial site assessment program refers approximately 20 percent of its sites per year to the removal program.
- Region G—During the past two years, the remedial site assessment program has referred 95 sites to the removal program; the removal program has referred 17 sites to remedial site assessment.

In a Region where the removal and remedial programs were part of the same section, the Section Chief stated that the two programs work well together because individuals

communicate and there is a mutual commitment.¹ One Region publishes a weekly Superfund Bulletin that lists activities in each program.

3.2 Sampling Decisions

Data objectives affect sampling decisions within each program. Since program goals differ, different sampling and analysis protocols are often required. The function of removal assessment sampling is to better define the extent of known and suspected threats and to identify treatment and disposal options. Remedial site assessments investigate all possible threats to four pathways and then narrow them down to the most significant. However, even with differing program objectives, sampling activities for removal assessments and remedial site investigations have much in common.

Table 2 presents sampling decisions for both removal and remedial assessments. The sampling procedures are similar for each program, as described in program Standard Operating Procedures (SOPs) and Standard Operating Guidelines (SOGs). For example, procedures for purging and sampling a monitoring well do not vary from program to program, but sample analysis and ultimate use of the sampling data do vary.

Another difference between sampling objectives of the two programs is that the removal program often uses one or more types of representative (e.g., grid) sampling to define sources and threats at a site, with limited QA/QC samples. Representative sampling may include judgmental (biased), random, and grid locations plus composite samples to assist in determining extent of contamination. Removal program samples are analyzed for suspected contaminants based on site history and initial field screening results. In contrast, the remedial SI uses judgmental sampling and seeks to fully characterize all possible contaminants present and migrating from sources at the site. This characterization relies on full Contract Laboratory Program (CLP) Target Analyte List (TAL) and Target Compound List (TCL) analyses.

One Region successfully addressed different program sampling needs during a combined assessment pilot by sending approximately 40 percent of the samples collected to a non-CLP laboratory selected to provide quick results for removal assessment decisions; the laboratory assigned by the Central Regional Laboratory (CRL) analyzed the remaining samples to satisfy the more stringent data quality objectives (DQOs) of the remedial site assessment process.

3.3 Removal and Remedial Assessment Activities

Table 3 lists assessment activities common to both the removal and the remedial programs, and Tables 4 and 5 present activities unique to each program. Table 3 illustrates that both programs have many activities in common. Most important, both programs identify imminent threats to human health, welfare, and the environment, as well as releases and potential releases of hazardous substances.

¹Because of a recent reorganization, separate sections have been established within the branch.

Table 2
Sampling Decisions

Activity	Removal Assessments	Remedial Assessments
Composite sampling	Used often within a source to evaluate composition and extent of on-site contamination.	Generally not recommended; can be done within a single source.
Field analytical screening techniques and real-time monitoring	Used regularly with limited fixed laboratory confirmation samples; used to support removal action decision.	Used to plan sample locations for EPA's Contract Laboratory Program (CLP) analysis.
Target Analyte List and Target Compound List analysis	Not required; rarely used for removal action decision, although may be performed for non-time-critical sites; removal analyses limited to known or suspected contaminants or categories of substances, determined through field hazard-categorization test kit analyses.	Recommended at all sites (with some exceptions) to ensure no screened false negatives.
Source sampling	Emphasis of removal assessment; majority of samples taken, used to determine threat and extent of contamination.	Important to identify and attribute all possible hazardous substances with potential to migrate.
Target sampling	Used only for suspected impact, for example, residential soils.	SI samples required to investigate actual or potential contamination within miles of site and migration influence.
Use of analytical services	Limited CLP or CLP-equivalent analyses due to turnaround time and costs.	CLP or CLP-level QA recommended for most samples; CLP Special Analytical Services used for all special or unusual analyses.
Number of samples	No prescribed range.	On average, 12 to 20 per SI.

Table 3
Activities Common to Both Removal and Remedial Assessments

Evaluate response authority, CERCLA eligibility
Perform file search and review existing data
Collect regional and local environmental information
Identify property owners and potentially responsible parties (PRPs)
Conduct a title or deed search
Interview state and local authorities, site personnel, and nearby residents
Obtain maps (topographic, geologic, others)
Make telephone calls to collect target and resource use information
Prepare site description and operational history
Prepare source and containment description
Collect source samples
Determine general hydrogeologic, hydrologic and physical settings
Perform geophysical surveys (e.g., magnetometer)
Describe actual and potential contamination to targets, including:
Ground water drinking water supplies
Surface water intakes
Population in vicinity of site
Sensitive environments and ecosystems
Direct contact, including site accessibility
Evaluate threat of fire or explosion
Conduct site reconnaissance
Observe and document site conditions, generate site sketch, photodocument site
Verify overland flow route
Identify source and nature of release or threat of release
Evaluate threat to public health and environment
Evaluate threat to on-site workers
Conduct sampling and laboratory analysis to demonstrate release to targets
Reporting:
Sampling plan
Site file and logbook
Contractor trip report
PA, SI, or removal assessment reports
Summarize existing analytical data and prior response activities
Recommend health or risk assessment

Table 4
Activities Unique to Removal Assessments

<p>Determine if release quantity or concentration warrants federal response</p> <p>Assess whether a potentially responsible party is providing appropriate response</p> <p>Secure or contain releases in emergency situations</p> <p>Perform soil gas surveys</p> <p>Excavate and sample test pits</p> <p>Perform field analytical screening (e.g., hazard categorization (HAZCAT), air monitoring, grid sampling)</p> <p>Conduct representative sampling (e.g., grid), with emphasis on composites</p> <p>Perform extent of contamination sampling</p> <p>Assist community relations activities</p> <p>Track costs</p> <p>Evaluate response, treatment, and disposal options</p>

Table 5
Activities Unique to Remedial Assessments

<p>Evaluate RCRA eligibility</p> <p>Describe actual and potential contamination to targets, including:</p> <ul style="list-style-type: none"> Fisheries Sensitive environments <p>Verify probable point of entry to surface water</p> <p>Verify targets:</p> <ul style="list-style-type: none"> House counts Surface water targets within 15 downstream miles Wells within 4 miles Population within 4 miles <p>Collect sample from nearest well</p> <p>Collect samples to demonstrate attribution</p> <p>Reporting:</p> <ul style="list-style-type: none"> PA data and site characteristics form HRS scoresheets and documentation record, PA-Score or PREscore
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The two programs differ in the scope of the assessment activities. For instance, the removal program generally focuses on on-site surface contamination, while the remedial program focuses on both on-site and off-site migration. Identification of nearby population and environmental targets differs. The removal program investigates human populations and environmental targets affected in the immediate vicinity of the site within no prescribed distance limit; site-specific conditions determine distance. In contrast, the remedial program investigates human and environmental targets actually and potentially affected within specified distance limits from site sources.

Each program's sampling and analytical methods reflect differences in its scope. The removal program performs limited sampling to demonstrate on-site surface contamination; remedial investigators conduct limited on-site source sampling, but also sample to demonstrate contamination at targets. Because of its emergency focus, the removal program collects samples to provide a representative but quick analysis, which may include field screening analyses, composite sampling, and the use of non-CLP laboratories for quick turnaround of results. The removal program establishes no set guidelines on numbers or types of samples, which vary with the specifics of each site.

The remedial site assessment program provides guidelines on sampling, including prescribed ranges of numbers and types of samples for the HRS evaluation, which requires stringent quality assurance levels. The remedial site assessment program generally does not use composite samples and field screening analyses except to locate samples for CLP analysis. Removal program sample analysis is often limited to categories of substances or specific analytes (based on field results), while remedial program sample analysis includes all the CLP TAL and TCL substances to identify all potential hazardous materials and to avoid false negatives. Section 3.6 provides more discussion of QA/QC requirements for removal and remedial assessments.

3.4 Event Tracking and Response Reporting

This study briefly examined event tracking and reporting issues, including the removal and remedial program use of various information management systems. Issues remain regarding the use of CERCLIS and other databases prior to SACM, and new issues emerge associated with SACM implementation. Information management issues include:

- Differences in program use of CERCLIS
- Multiple databases for tracking site activities
- Proposed RDT reporting mechanisms
- Separate or combined program reporting
- Variability of cross-program referral and communication
- Timing of data entry (discovery, assessment dates)
- Non-standardized site names and identification numbers
- Inability to cross-reference information from one database to another or to build a comprehensive information system

3.4.1 CERCLIS

This study polled Regional and headquarters representatives of the removal and remedial programs, who indicated that CERCLIS use varies significantly between the two programs. Remedial personnel in two Regions stated that they enter events, start and completion dates, and event qualifiers into CERCLIS. Superfund program management requires entering an event qualifier (e.g., stabilization, cleanup) with the completion date for a site activity; all other data are optional. Regional removal program staff were less certain which types of removal program information they should enter into CERCLIS. Headquarters requests that the Regions provide all CERCLIS data element information pertaining to removal actions, but does not specifically require registering any of the requested information.

At least two Regions track removal assessments in independent in-house databases. Removal staff often enter sites into CERCLIS either with or without a discovery date and without notifying the remedial program, which must meet the statutory deadline of performing a PA within 12 months of site discovery entry into CERCLIS. Removal program staff asked how sites that have been assessed as no risk may be incorporated into CERCLIS without necessitating a remedial PA.

Some removal program staff would like to be able to track all removal sites through CERCLIS, not just sites with removal actions. In at least one Region, the removal and remedial programs assign different names to the same site, making it difficult to relate data for the two programs.

3.4.2 ERNS

The removal program uses the Emergency Response Notification System (ERNS) database for tracking initial notification of releases, on-scene monitoring, and assessments. Regions use ERNS as a tool to track initial notification of potential or actual hazardous substance release incidents, but Regional practices of tracking assessment and other follow-up response actions through ERNS are variable. ERNS does not contain extensive information prior to 1987, the date the system became available.

To accommodate the reporting requirements of SACM, a new or revised CERCLIS event may need to be added. This event would be applicable to sites where a combined assessment will be conducted. This event might include decision points to accommodate sites where only a removal assessment is necessary, only a remedial assessment is conducted, or where a combined assessment by both programs is conducted. When a combined assessment is conducted, the remedial program will be responsible for preparing the assessment report and entering the necessary data into CERCLIS.

3.4.3 SCAP and STARS Targets and Measures

Removal and remedial SCAP and STARS targets and measures are used to plan and allocate funds for each Region. The Regions must enter the targets and measures into

CERCLIS to provide headquarters with information concerning funding requirements. Without any other specific data entry requirements, each Region has the option of entering into CERCLIS minimal or extensive amounts of site information.

3.5 Contractor Support

Contractor staff requirements under dedicated statements of work (SOWs) provide another basis for comparing programs to examine the technical integration of removal and remedial assessments. The removal program utilizes the services of the Technical Assistance Team (TAT) and Emergency Response Cleanup Services (ERCS) contractors, among others. The TAT contract provides EPA headquarters and the Regions with a broad range of technical support services for both the oil and hazardous substance release portions of the emergency response program. Services include sampling, procurement of field and laboratory analyses, community relations, contingency planning, training, data management, and quality assurance. TAT also provides support services for the prevention program, response preparedness, emergency response, and special projects. The ERCS contract provides actual cleanup services in response to releases of hazardous substances. Remedial program site assessment work is supported by Alternative Remedial Contracting Strategy (ARCS) contractors and state site assessment staffs. The ARCS contracts provide a broad range of program management and technical services needed to support remedial activities. ARCS contracts are managed by Regional EPA personnel for tasks such as PAs, SIs, and other site evaluations, well drilling and monitoring, geophysical investigative support, waste disposal and drum removal, aerial photography, geotechnical consulting services, and analytical services. ARCS contracts support site assessment and remedial branches of the remedial program. Prior to ARCS, the Field Investigation Team (FIT) contracts supported site assessment work.

The removal program's TAT contract staff and the remedial program's ARCS staff are composed of a core group of professional technical personnel with similar academic degrees and training. Each Regional TAT and ARCS contract team is required to maintain a certain number of technicians and junior and senior professional level staff. The junior and senior professional levels include geologists, biologists, chemists, environmental scientists, engineers, toxicologists, and other scientific, technical, and administrative professionals. The contracts require compliance with OSHA hazardous waste worker health and safety monitoring and training (OSHA section 1910.120), as well as technical quality assurance and sampling procedural training and specialized EPA sample documentation and QA/QC training. Individual training specific to each program is provided to the staff upon hire and is not a prerequisite to qualify for a position.

The difference in the basic personnel requirements for the removal and remedial programs stems from the emergency nature of the removal program. Emergency response situations require that some persons be available who are capable of responding to classic emergencies which may require Level A (the most protective) personal protection equipment, and that a large percentage of the contract personnel be trained to respond to time-critical and non-time-critical removal situations. Staff

members are specially trained with on-site experience to assess and respond to a release with limited available data and information. They are on call 24 hours a day for immediate response to emergency situations. In addition, dedicated TAT contractor SOWs require the performance of specialized tasks, such as Spill Prevention, Control, and Countermeasures (SPCC) and Title III inspections and chemical safety audits.

3.6 Analytical Quality Assurance Requirements

Quality assurance procedures in the removal and remedial site assessment programs are comparable but not exactly analogous, each having a hierarchy of data quality and verification requirements. Overlap in QA requirements allows sharing of data between programs.

Comparison of remedial site assessment Data Use Categories (DUCs) (*Guidance for Data Useability in Site Assessment*, in development) with the removal program Quality Assurance (QA) Objectives (*QA/QC Guidance for Removal Activities: Sampling, QA/QC Plan and Data Validation Procedures*, April 1990) reveals a degree of correlation between respective data categories. Removal QA Objectives 1 through 3 are numbered from least rigorous QA (1) toward most rigorous (3). Remedial site assessment DUCs I through III are labelled the opposite way: DUC-I is the most rigorous QA. QA Objective 3 and DUC-I are virtually the same, with the following notable exception: the defining characteristic of QA Objective 3 is the mandatory analysis of performance evaluation (PE) samples and eight replicates for statistical error determination. (The QA3 requirement for error determination has no counterpart in remedial site assessment.) QA Objective 2 is a verification objective requiring that approximately 10 percent of a sample set undergo external laboratory analysis by EPA methods with rigorous QA. This laboratory subset of QA2 samples meets DUC-I requirements because it requires identification of analytes, estimated concentrations, and laboratory QA deliverables similar to those in the Contract Laboratory Program (CLP). QA2 is far more rigorous than DUC-II and differs from QA3 only in the omission of error determination and in the number of samples undergoing laboratory analysis. The combination of analyte-specificity and quantitative results is not included in DUC-II, DUC-III, or QA1 data, which are regarded as "screening" applications in their respective programs.

To support NPL documentation, rigorous DUC-I (or CLP-equivalent) data are generally used. In contrast, the removal program employs its most rigorous objective, QA3, only about once per quarter, when analytical results approach the action level and error determination is necessary. At most sites, the removal program relies on QA2 to provide quantitative or qualitative data to verify field screening results. Confirmation of field screening by fixed laboratory results is sufficient to demonstrate the need for a removal action at most sites. Remedial site assessment uses its less rigorous DUCs only to approximate contamination boundaries and to plan samples for DUC-I analytical objectives.

The removal *QA/QC Guidance* specifies data validation requirements consistent with *National Functional Guidelines* (1988, 1991). QA3 requires independent validation of

holding times, blanks, calibrations, detection limits, spikes, and validation of elements or compounds for at least 10 percent of the samples. QA2 requires validation of holding times, blanks, and detection limits for all samples. In addition, 10 percent of the samples must undergo full validation of analyte identity or quantitation. QA1 samples are checked for proper instrument calibration.

DUC-I requires validation of all data elements contained in QA3 plus the additional validation of PE samples. All analytes in DUC-I data must be validated for a certain percentage of the data. DUC-II data may be validated for detection limits, blanks, calibrations, PE materials, and matrix spikes, if desired.

3.6.1 Use of Non-CLP Laboratories

The removal program rarely uses the CLP because routine data turnaround times often exceed the entire duration of a removal assessment. Because of the urgent nature of the removal program, OSCs need analytical results as soon as possible, often within 24 hours. *TAT Operating Procedures (OP) for Non-CLP Analytical Services* (August 1991) provides a list of QC options for different analytical methods to allow TAT personnel to specify QC requirements in exact technical terms. The TAT OP also specifies standard terms and conditions to enable completing laboratory procurement within 24 hours. (The list itself is not a QC guidance document.) Non-CLP laboratories must comply with removal program QA objectives.

The removal program may procure laboratory services from any laboratory not under EPA debarment. CLP laboratories may be solicited but are not given preference over other laboratories. Award of laboratory services goes to the lowest bidder responsive to requested turnaround time and QA requirements. Although the TAT OP provides choices of standard laboratory QA/QC deliverables, the exact number of laboratory QA/QC samples (matrix spikes, duplicates, laboratory control samples, etc.) per analytical package is not standardized. The removal program selects laboratory QA samples to meet site-specific data requirements; thus the type and number of laboratory QA samples vary by site.

In contrast, remedial site assessment guidelines recommend that non-CLP analyses follow CLP requirements for QA and documentation as closely as possible. Non-CLP data in remedial site assessment must meet certain QA requirements to support NPL documentation; these are generally more rigorous than removal program QA/QC requirements. The CLP methods specify standard types and numbers of laboratory QA samples per batch.

3.6.2 Analytical Costs

As discussed above, the CLP is used for analyzing samples collected during remedial site assessments. The average cost for CLP TAL and TCL analyses is \$1,100 per sample. The average laboratory turnaround time is approximately 4 to 5 weeks.

The number of samples collected during a removal assessment varies according to the site and the nature of the release. Site conditions also determine analytical parameters, and analyses are usually limited to a few specific substances or types of substances. The average removal assessment sample has three analytical parameters, a 15-day turnaround time, and costs approximately \$360.

3.6.3 Data Integration

Tables 6 and 7 compare specific analytical QA and documentation requirements for both programs. The overlap in the data validation procedures between the two programs suggests that much of the removal data can be used for remedial assessment. Although the programs use different laboratories, both programs validate their data according to *National Functional Guidelines*. Since QA3 data exceed DUC-I requirements, they are usable for NPL documentation. However, QA3 data are collected only approximately once per quarter. Most of the analytical data generated by the removal program meet QA2 standards. Minimally, 10 percent of QA2 data from analytical laboratories meet DUC-I requirements and are usable for NPL documentation. QA2 laboratory data confirm results of field analytical data, so it is possible that an entire set of QA2 data (approximately 90 percent field analytical data, 10 percent laboratory data) is usable for NPL documentation. There is precedent in the remedial site assessment program to use field analytical data associated with laboratory data. Some approximated or qualified concentration data have been used for NPL documentation if they were associated with samples analyzed under DUC-I.

Since the removal program does not obtain full TAL and TCL analytical results at every site, these data may not be usable for NPL documentation even if they come from appropriate locations and have undergone DUC-I analysis. If a removal data set did meet all remedial site assessment criteria for sampling location, analytical parameters, and laboratory QA/QC, the non-CLP package might still be difficult to validate and use. HRS evaluation with non-CLP data usually takes more time than with CLP data because validators must review raw data that do not follow a standard analytical format. When using non-CLP data, validators often depend upon the responsiveness of a laboratory (or upon payment of additional fees) to obtain quality control results or certifications not originally requested. Time spent validating a non-standard data package may possibly negate the savings of using those data in the first place.

Removal assessments and actions will continue to depend upon fast analytical results to mitigate immediate threats. The HRS evaluation and NPL documentation should apply QA2 field analytical data to the extent possible. Coordination between the programs could facilitate transfer of complete sets of removal data to the remedial program. It may not be cost effective for the removal program to obtain full CLP analyses or for the remedial program to use available removal data. Future SACM implementation guidance will provide detailed specifications and guidelines for data quality and applicability.

Table 6
Analytical QA Requirements
 (Page 1 of 3)

	Removal	Remedial (Site Assessment)
Level	QA Objective 3	DUC-I
Characteristics	Data indicate accuracy of concentration levels and analyte identity. Rigorous quality control procedures demand high degree of qualitative and quantitative accuracy. Minimum of eight replicates analyzed to make statistical error determination. One hundred (100) percent of samples collected have analyte identification confirmed by second method (e.g., EPA GC/MS or GC).	Data indicate accuracy of concentration levels and analyte identity. Analytical error determinations made for all samples. Documentation of precision and accuracy. High level of documentation, and low ppm or high ppb detection limits minimize uncertainty.
Applications	Applications where action levels are extremely sensitive: treatment, disposal, site remediation, health risk, environmental impact, cleanup verification, pollutant source identification, delineation of contaminants. QA Objective 3 rarely used in removal program; requires PE samples.	Demonstration of a release and identification of site-specific indicator chemicals, often at low concentrations. DUC-I usually required for NPL documentation.
Data Validation	Independent validation of holding times, blanks contamination, initial and continuing calibration, detection limits, spikes, and replicates for all samples. All elements or compounds validated for at least 10 percent of the samples. Entire contents of every tenth package from an individual laboratory is validated. Automated data validation available.	Independent validation of holding times, blanks contamination, detection limits, quantitation, initial and continuing calibration, performance evaluation and matrix spikes for all samples. Full data review of all analytes for specified percentage of data. (Percentage varies by Region.)

Table 6
Analytical QA Requirements
(Page 2 of 3)

	Removal	Remedial (Site Assessment)
Level	QA Objective 2	DUC-II
Characteristics	A subset of field samples (usually ≥ 10 percent) have confirmed analyte identification. This subset verifies results for samples analyzed under less rigorous requirements. Samples with confirmed analyte identification meet all analytical requirements for QA Objective 3 except error determination.	Provides verified, quantitative data. Analyte-specificity not required. Only a percentage of analyte identities verified by rigorous DUC-I analysis and QA.
Applications	Determination of physical and chemical properties of samples from a release; extent and degree of contamination; verification of pollutant plume; verification of pollutant identification; and verification of cleanup. Removal program most frequently specifies QA Objective 2 for non-CLP lab analysis. QA Objective 2 lab analysis usually used as verification measure for field screening.	Determination of extent of contamination boundaries and other quantitative determinations in situations where chemical identities are already well established. Rarely used in remedial site assessment. Has been used in the past to determine extent of contamination. Samples intended for DUC-II analysis are almost always associated with DUC-I samples for confirmation.
Data Validation	Validation of holding times, blanks, detection limits for all samples. Validation of 10 percent of samples for analyte identity, quantitation, and replicates. Automated data validation available.	Optional data validation for detection limit, blanks, initial and continuing calibrations, performance evaluation materials, and matrix spikes.

Table 6
Analytical QA Requirements
(Page 3 of 3)

	Removal	Remedial (Site Assessment Branch)
Level	QA Objective 1	DUC-III
Characteristics	Data provide rapid, preliminary assessment of types and levels of pollutants. Data generated at this level do not always provide definitive identification of pollutants or their concentration levels.	Data provide qualitative analytical information, and determine gross areas of contamination.
Applications	Determination of physical and chemical properties of pollutants during release, extent and degree of contamination relative to concentration differences, delineation of pollutant plumes, monitoring well placement, waste compatibility, hazard categorization, initial health and safety assessment, preliminary identification, or quantitation of pollutants. QA Objective 1 samples are collected at nearly every site that is sampled.	Locating contaminated areas, and making preliminary health and safety decisions. Primarily used to select sampling areas for DUC-I samples.
Data Validation	Validation checks instrument calibration, calculations.	Not required.

Table 7
Data Requirements for Removal and Remedial (Site Assessment) Programs

Data Reporting Requirements	Removal QA Objective			Site Assessment DUC		
	1	2	3	III	II	I
Sample documentation	R	R	R	R	R	R
Chain of custody		R	R		R	R
Documentation of sample collection and analysis dates		R	R		R	R
Sample weight and volume		R	R		R	R
Dilution factors		R	R		R	R
Initial and continuing instrument calibration data	R	R	R		R	R
Detection limits	R	R	R		R	R
Documented confirmation of analyte identity		R	R			R
Documentation of sample quantitation		R	R		R	R
Method blanks, trip blanks, rinsate blanks		R	R		R	R
Error determination with eight replicates			R			
Matrix spikes or duplicates		R	R		*	R
Performance evaluation samples		O	R		*	R
Percent of data validated by National Functional Guidelines		R	R			R
Raw data			R			R
Separate reporting of initial analysis and reanalysis						R

R = Required O = Optional

* = At least one is required.

4.0 REGIONAL ISSUES

This section examines detailed Regional assessment practices and activities. It summarizes how removal program data can support remedial site assessment objectives and how data collected for NPL documentation can support removal assessment objectives. It draws its results from a comparison of Regional removal and remedial assessment and removal action reports and a technical survey of all Regions to characterize removal assessment activities and procedures. This section also identifies specific removal data that address remedial site assessment data requirements for the HRS, and the removal program's resource, training, and guidance needs to collect this information.

4.1 Comparison of Regional Reports

This study compares a sample of Regional removal and remedial assessment and removal action reports from eight of the ten Regions. The reports present comprehensive documentation of 13 sites inspected by both programs. The removal and remedial reports were completed by EPA staff or their TAT, FIT, or ARCS contractors, and state personnel. Most reports include information on:

- Site location and description
- Probable cause of release and summary of contamination
- Site history, including previous clean-up actions
- Summary of waste types, physical state, quantity, and characteristics
- Samples and analytical results

Removal assessment and action reports focus on describing the immediate incident, removal activities, cause of release, efforts to find responsible parties, and a general assessment of threat to the public and environment. For example, three Region 5 OSC reports assessing the need for removal actions at a single site between 1989 and 1991 provide a general assessment of public health and environmental threats, including actual or potential exposure to hazardous substances by nearby populations, animals, or the food chain; contamination of drinking water supplies or sensitive environments; and the potential for migration of contaminants in soil. The removal reports examined in this study did not provide an analysis of potential risk and exposure pathways. An exception was a Colorado Department of Health removal PA report that comprehensively described migration pathways, potential targets, and general risk assessment criteria. It examined a 4-mile radius for number of wells and ground water population, and potential ground water and surface water contamination. It also investigated the distance from the site to nearest residences, and population within one mile.

Remedial assessment reports contain specific target information, such as populations within the site vicinity, surface water use, nearby populations potentially affected by ground water and surface water contamination, and wetlands and other sensitive environments which may not be reported in removal assessment reports. In addition to source and waste characteristics, and ground water, surface water, soil exposure, and air pathway characteristics, remedial assessment reports identify sensitive environments and

frequently describe physiography, cultural features, climatology, drainage, soil types, geology, and stratigraphy. A Region 7 FTT Screening Site Inspection report and a Wisconsin Department of Natural Resources Site Inspection report examined in this study both contained these types of information.

Of the small sample of Regional reports this study examined, all removal and remedial assessment reports met the NCP criteria. Regional removal assessment reports varied widely in content and format, largely due to incident-specific conditions and the lack of standard reporting procedures. Remedial assessment reports generally followed national PA and SI guidance for format and content and addressed a set of migration pathway and risk criteria more comprehensively than removal assessment reports, which focused on immediate threat reduction.

4.2 Review of Regional Surveys

Headquarters Hazardous Site Evaluation Division and Emergency Response Division jointly distributed a questionnaire to Regional EPA removal program personnel (OSCs and, in Region 1, Site Investigators) and TAT contractors. The questionnaire surveyed specific assessment activities, including field tasks, analytical data, and laboratory specifications. Fifty percent of the OSCs responded (representing six Regions), and 100 percent of the TAT contractors responded. Sections 4.2.2 through 4.2.9 discuss the survey results.

Survey respondents noted that the objective of assessing a site is to identify threats. Respondents use visual observations accompanied by judgmental (biased) sampling techniques to assess conditions for possible removal action. Specifically, the goal of an assessment is to determine hazard conditions at a site and to assess whether those conditions meet NCP criteria for a removal action. Generally, the most critical task is to identify immediate threats to the population and the environment by investigating whether hazardous substances are present on site and assessing the potential for their release. One OSC neatly defined the assessment process: "screen, then focus in."

The removal assessment determines whether a release meets NCP criteria by:

- Performing a visual assessment
- Researching site history
- Conducting interviews
- Sampling as necessary to identify the presence and the sources of hazardous substances at the site with a potential for release

The removal assessment can be as simple as a site reconnaissance and the collection of one or two drum samples, or it can entail grid samples over a large area. Sample collection methods, number and location of samples, and types of analyses are dependent on site conditions.

In all Regions, TAT generally performs the assessment, with the OSC (or Site Investigator in Region 1) overseeing and determining removal action options, based on

the assessment results. Regions 1 and 7 have formalized procedures for performing and documenting removal assessments. Other Regions vary in the degree of detail.

4.2.1 Removal Action Criteria in Remedial Site Assessments

Table 8 presents the NCP criteria for a removal action (NCP section 300.415(b)(2)(i to viii)) and indicates whether each item is evaluated during remedial site assessments (PAs and SIs).

Remedial site assessments typically evaluate many removal action criteria. For example, remedial SIs investigate hazardous substances in soils, contaminated drinking water, and contaminated fisheries, and the threat hazardous substances pose to sensitive environments. In some instances, SI sampling results provide data to initiate a removal action by the removal program. Two criteria not typically included in remedial site assessments are weather conditions capable of aiding or causing a release, and appropriate response by other authorities. These criteria may be considered if flood or severe storm potential exists or if there is a history of response at the site.

4.2.2 HRS Criteria in Removal Assessments

Removal assessment data collection depends mostly on site-specific conditions with no established list of data needs. The removal assessment must quickly determine the need for a removal action. The removal assessment does not research and document populations within a 4-mile radius or 15 miles downstream from the site, as required in remedial site assessment. The removal assessment assesses the population in the immediate site vicinity, perceived to be most at risk.

Table 9 presents the site assessment criteria required for the NPL listing process and indicates whether these criteria are evaluated during a removal assessment. Regional removal program survey respondents stated that they evaluate other HRS/NPL criteria such as ground water and surface water uses, intakes, population, and sensitive environments if site-specific conditions warrant, but it is not done routinely. The Regions stated that they need guidance and training on HRS requirements and definitions, plus additional time and resources, to address all remedial site assessment criteria.

Remedial considerations and HRS data needs routinely addressed during removal assessments include: determining CERCLA eligibility, conducting a site reconnaissance, evaluating hazardous waste quantity, assessing overland runoff route, and determining the potential for contamination of off-site properties. A removal assessment generally does not assess RCRA eligibility. The removal assessment evaluates hazardous waste quantity to select a treatment or disposal option and estimate its cost. Waste quantity is an important factor in the remedial ranking evaluation.

Table 8
Removal Action Criteria in Remedial Site Assessments

NCP Section 300.415(b)(2)	Removal Action Criteria	Evaluated by Remedial Site Assessment
(i)	Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants	Yes
(ii)	Actual or potential contamination of drinking water supplies or sensitive ecosystems	Yes
(iii)	Hazardous substances or pollutants or contaminants in drums, barrels, tanks, or other bulk storage containers, that may pose a threat of release	Yes
(iv)	High levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface, that may migrate	Yes
(v)	Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released	No
(vi)	Threat of fire or explosion	Yes
(vii)	The availability of other appropriate federal or state response mechanisms to respond to the release	No
(viii)	Other situations or factors that may pose threats to public health or welfare or the environment	Yes

Remedial HRS/NPL Criteria in Removal Assessments^{*}

Remedial Listing Criteria	Evaluated In Removal Assessments	Explanation for Variations
CERCLA/RCRA eligibility	*	CERCLA only
Site reconnaissance	Yes	
HRS source types	*	Sources characterized, but not HRS
Hazardous waste quantity	Yes	
Ground water use within 4 miles	*	Immediate vicinity only; site-specific
Geology/karst terrain and depth to aquifer	*	Only if contaminated drinking water
Overland runoff route/probable point of entry	*	Overland runoff route only
Drinking water intakes within 15 downstream miles	*	Immediate vicinity only; site-specific
Sensitive environments and wetlands within HRS target distance limits	*	Site-specific
Fisheries within 15 downstream miles	*	Site-specific
Potential for off-site contaminated properties	Yes	
Population within 4 miles	*	Immediate vicinity only (1 mile)
Background samples	*	For contaminated soils only
Source samples	Yes	
Release samples (ground water, surface water (aqueous, sediment))	Yes	
Ambient air samples	Yes	
Nearest well sample	*	If contaminated DW is suspected
Residential property soil samples	*	If contaminated property is suspected
Biased samples	Yes	
QA/QC samples (e.g., trip blanks, duplicates)	Yes	

* Results are based on general Regional responses; some removal assessment may not cover all aspects.

* Occasionally; see Explanation for Variations

The Regions report that they do not generally collect the following HRS data needs during a removal assessment, unless site-specific conditions warrant: population and ground water use within 4 miles; geology, occurrence of karst terrain, and depth to aquifer; and drinking water intakes, fisheries, and sensitive environments within 15 downstream miles. The extent of local geologic and aquifer information collected during a removal assessment depends on the site; in general, a removal assessment does not evaluate ground water beyond assessing local drinking water contamination. Although they report that removal assessments generally do not determine HRS source types, the Regions do characterize waste sources by type and appropriate amount. They can use this information directly for the HRS.

Sampling objectives for removal assessments and remedial SIs are generally similar. A removal assessment may include collection of background, source, release (e.g., ground water, surface water, sediment, and air), residential property soil, and QA/QC samples. However, unlike during remedial SIs, removal assessments do not evaluate or even consider all pathways. The number and types of samples collected depend on the wastes on site and the threat of probable release off site. Removal program investigators collect ground water samples only when they suspect that drinking water wells are contaminated, and residential soil samples only if there is reason to believe that a property could be contaminated.

Removal assessments often utilize composite samples. This makes it difficult to use the analytical data for NPL documentation since grab samples are generally needed for comparability to background and other measures of exposure. Composites are practical and cost-effective for a removal assessment; grab samples are not practical for characterizing an entire waste pile to select a treatment or disposal option. The removal program collects background samples, often composites, to evaluate contaminated soil, but does not generally require them when assessing other media. As in remedial SIs, removal assessments often include judgmental sampling, but they use composites whenever possible to keep costs down.

Background research as part of a removal assessment, however thorough, does not target specific HRS data needs since removal assessments do not require this information.

4.2.3 Removal Assessment Activities

Removal assessments include a number of specialized activities with little or no distinction between those performed for PAs or SIs. This trend indicates that there may be no distinction between these evaluation stages in Regional practice, with the following exceptions.

Two Regions noted a distinction in activities between assessment stages during the removal site evaluation. Region 1 performs distinct PAs and SIs. The PA consists of pre-site visit activities such as collecting background file information, identifying site owners, and obtaining access to the site. The SI involves visiting the site and sampling as necessary. Region 4 also distinguishes between those activities completed for a PA and an SI.

Region 7 has developed a series of Regional Superfund Removal Procedures manuals for various removal assessments dependent upon the anticipated type of removal action, including emergency removal actions, small drum removal actions, and time-critical removal actions. The manuals include prescribed formats for documentation.

The Regions generally perform the activities listed in Tables 3 and 4 where needed to determine the presence of contamination and whether a site poses an immediate threat to public health and the environment. Since every site requires site-specific activities to fully assess the threats, the activities listed in Tables 3 and 4 will vary by site.

4.2.4 Health Assessment and Risk Assessment

The evaluation of health-based threats (health assessment) determines the need and urgency of removal actions, the available and feasible risk reduction options, and the specific action levels or goals. A removal assessment does not include a risk assessment as strictly defined. OSCs often determine health-based threat in consultation with the Agency for Toxic Substances and Disease Registry (ATSDR), or based upon federal and state regulations, EPA directives, or removal program action levels (where these exist). Region 8 utilizes a staff toxicologist to assist in risk evaluation using data collected by TAT, although TAT does not perform health or risk assessments. The data used for removal assessments may be used for risk assessments performed by the remedial program if the site undergoes long-term remediation.

4.2.5 Reports

The Regions vary in their degree of reporting and documenting removal assessments. Documentation varies from a trip or letter report to a report similar in scope and content to that required for remedial PAs and SIs. The Regions track all sites in some way, although the methods vary. Most Regions indicated that, at a minimum, they enter all sites into ERNS. The incident is included in ERNS through an incident notification form; site information in ERNS is available to all EPA personnel.

TAT documentation of a removal assessment includes, at a minimum, a Technical Direction Document (TDD) and an Acknowledgement of Completion (AOC). Other reports that may be required by the TDD include logbooks, photographs, trip reports, formal reports, and POLREPs.

4.2.6 Site Referral

The survey asked specifically about referral processes for sites receiving a removal assessment but deemed not to meet the criteria for a removal action. Most Regions responded that they refer the site to either a state or local agency, or to another EPA program (e.g., remedial or underground storage tank). They did not report referral methods in the survey responses. (A respondent from Region 8 noted that since they enter data for all removal sites into ERNS, this database is available for remedial program personnel to review as a means of cross-program referral.) Several Regions indicated that they maintain Regional tracking databases. A Region 1 Site Investigator

noted that if they perform a full removal assessment (incorporating both PA and SI activities), they provide copies of the report to remedial site assessment personnel and state agencies; this process does not apply to emergency action sites, which do not receive full assessments by the removal program.

Region 9 indicated that they refer most of the sites entered into ERNS to state or local authorities for follow-up; EPA responds to only a small percentage of the incidents reported. Of the approximately 5,000 incidents reported in ERNS per year in Region 9, 500 (10 percent) require follow-up phone calls to complete ERNS information, and 100 (2 percent) require a site visit by EPA or its contractors. A letter report is prepared for all assessed sites. Fifteen (0.3 percent) of the original 5,000 reported incidents in Region 9 undergo a federally funded removal action.

Section 3.1 of this report provides additional discussion of cross-program site referral.

4.2.7 Sampling Strategy, Sample Collection and Analysis

Sampling strategy during removal assessments is generally the same in all Regions, although the procedures and the numbers and locations of samples vary. EPA collects samples during removal assessments to determine the sources of waste, whether a release has occurred, and whether a threat exists. Samples are limited to on-site sources except when the objective is to evaluate imminent risk. EPA may also collect samples to establish the scope and costs of treatment and disposal options. At some sites, EPA collects samples to establish extent of contamination to investigate migration of a release. Collecting environmental (i.e., off-site) samples may be needed to assess threat but it is not the main sampling objective for removal assessments.

Sampling methodologies vary Regionally and between programs. Remedial SIs generally perform judgmental sampling to identify hot spots of actual contamination, using a combination of environmental and source samples, with some QA/QC samples to confirm data. Removal assessments often use one or more types of representative (e.g., grid) sampling to define sources and contaminated soil, but with more limited QA/QC samples. Representative sampling may include judgmental, random, and grid locations plus composite sampling (particularly over large areas) to assist in determining extent of contamination.

Two OSCs described the general Regional approach for a removal assessment: the Regions use random and judgmental sampling to determine if a removal action is warranted; they routinely use grid and composite sampling to define migration of a release (depending upon the apparent extent of contamination). For example, the Regions may collect random samples at a site with no known history and little visual evidence of release. They may also use random sampling to select background samples.

Sample number varies and is determined by site-specific conditions such as site area and terrain. For example, site investigators use grids of small dimension (resulting in more samples per area) at a small site, but not at a large industrial site. At a small site, grid spacing can be smaller to define the extent of contamination. At a large abandoned

industrial site, for example, the first objective is to locate the contamination, the next is to define its extent. A larger grid spacing is more feasible and cost-effective. If the smaller site has drums, the investigating team will field screen each with a hazard categorization (HAZCAT) analytical kit, if possible, and send one sample of each identified hazard category for off-site laboratory analysis. The team will sample the surrounding soil if it appears that material within the drums has spilled. On the large site, the team will set up a grid to collect composite soil samples. They might selectively sample a large number of drums, based upon label or historical information and HAZCAT results. The number of samples collected during an assessment can range from fewer than ten to several hundred, depending on the site and the data needed to assess the removal action criteria.

Sampling procedures follow Regional SOPs, EPA removal program or Environmental Response Team SOPs, TAT contractor SOPs, and *Quality Assurance/Quality Control (QA/QC) Guidance for Removal Activities, Sampling QA/QC Plan and Data Validation Procedures*, 1990.

Generally, sampling activities during removal assessments involve extensive field analytical screening, with a limited number of samples undergoing laboratory analysis. The investigating team generally sends a minimum of 10 percent of field screening samples for laboratory confirmation. Region 8 reports that the percentage of samples sent for laboratory analysis may be more than 10 percent, and may vary considerably, based on the site and site-specific objectives. For example, at a drum site, the investigating team may submit for laboratory analysis 20 percent of the total field samples collected and field analyzed, but at a pesticide site, the team may submit 60 percent. Region 8 TAT indicated that they base the range partly on the category of sample—10 percent of environmental samples receive laboratory confirmation, compared to 100 percent of source waste samples. When time allows, the Region bases its decision to recommend a removal action on laboratory results which confirm field screening indications. Section 4.2.8 and Table 10 indicate laboratory analyses commonly requested by all Regions for removal assessments.

Field screening and analysis capabilities vary Regionally, although most Regions utilize standard monitoring instruments such as photoionization detectors, flame ionization detectors, radiation meters, and combustible gas indicators/oxygen meters. Most Regions have available field HAZCAT kits for categorizing waste types, colorimetric tubes for specific air borne contaminants, and immunoassay kits for such compounds as polychlorinated biphenyls (PCBs) and pentachlorophenol (PCP) in soil and water. Most Regions utilize portable X-ray fluorescence (XRF) spectrometers for field screening of metals. Of more limited availability and use in the Regions are the field gas chromatography/mass spectrometer (GC/MS) for organic compounds, electron capture for PCBs and pesticides, and field atomic absorption (AA) for metals. Mobile laboratories are available in some Regions and are useful when GC use is extensive.

The OSC or Site Investigator selects the methods, analyses, and numbers and locations of samples, depending on site characteristics and cost considerations. In some cases, the

Table 10
Removal Assessment Analyses and Costs

Analysis	Range of Costs (\$/sample)*
Total (listed) metals and organics	1,000 to 2,000
Volatile organics	125 to 450 (250 to 1,000 for air)
Semi-volatiles or base/neutral/acids	350 to 700
Pesticide/PCBs, PCBs only	145 to 400, 100 to 726
Dioxins	500 to 1,450
Metals (various methods)	17 to 700
Priority Pollutant metals	180 to 240
Toxicity Characteristic Leaching Procedure	125 (metals only) to 1,045 (full)
Ignitability/corrosivity/reactivity	150 to 205 (RCRA)
Asbestos	50
Arsenic	25 to 35
Cadmium	30
Cyanide	30 to 50
Lead	30 to 35
Mercury	30
Sulfides	75
Total organic carbon	40 to 60
Total organic halogens	90
Benzene/toluene/ethylbenzene/xylene	100 to 135
Total petroleum hydrocarbons	50 to 100
pH	10 to 15
Flashpoint	35 to 38
Radionuclides (gross alpha, beta, gamma)**	50
Gamma emitter identification**	125

* Cost ranges do not necessarily apply to all Regions. Costs vary due to method, sample medium, geographical location, and time of year.

** Cost data supplemented from other reference.

OSC or Site Investigator must custom-design the field methods for the data collection required at a site.

4.2.8 Laboratory Procurement, Costs, and Analytical Quality Assurance

In the remedial program, the CLP analyzes most of the samples collected by EPA and its contractors. A small number of samples may undergo specialized analysis through an EPA Environmental Services Division (ESD) laboratory. Because of time constraints and special analytical needs, the removal program generally uses one of three strategies for laboratory procurement and analysis. It contracts most laboratories via a bid process administered through the TAT (or another) contractor. In most cases this involves three bids. The removal program usually awards a contract based upon lowest cost and ability to meet turnaround time (typically two to three weeks). Some Regions prefer the use of a Regional ESD laboratory for most sample analysis. A Region may use a combination of Regional labs and the bid process.

Laboratory procurement varies. One OSC noted that in his Region, the removal program uses CLP laboratories as a last resort because of scheduling issues and delays. Another OSC indicated that he often requests CLP-equivalent data during assessments. The removal program uses many of the laboratories that are part of the CLP through the private three-bid process, not through the CLP scheduling and acquisition process. Table 3 lists common removal assessment analyses and the range of cost per sample analysis, but does not include the entire range of analyses available. Depending on background site information and the results of field screening analyses, analysis could also consist of specific chemical compound identification and quantification (e.g., tetrachloroethene (PCE) or hexavalent chromium [Cr^{+6}]). Table 3 provides costs as examples and only for comparison, which may vary with current industry rates.

The remedial program generally requests full TAL and TCL analyses for all SI samples. Special analytical services comply with some non-routine requests. This standardized broad screen provides comprehensive and consistent sets of data and the ability to identify substances not otherwise suspected at a site. The removal program selects specific analyses based on site historical information, visual assessment data, HAZCAT and other screening results, and potential waste treatment or disposal options. The removal program does not specify full TAL and TCL analyses unless no other hazardous substance definition can be made.

The OSC is responsible for specifying the QA objective and its associated reports from the laboratory. The objective depends on potential data uses, such as enforcement or removal action decisions. The OSC may use QA Objective 1 for sample and waste disposal, and QA Objectives 2 or 3 for litigation. For most removal assessments, the OSC requests removal QA Objective 2. (See *Quality Assurance/Quality Control (QA/QC) Guidance for Removal Activities, Sampling QA/QC Plan and Data Validation Procedures*, 1990, and section 3.6 of this report for a discussion of the removal program QA objectives.) Region 4 OSCs confer with the ESD to select a QA objective, regardless of the laboratory procured. The Regional ESD laboratory, if used, may set the QA standards without input from the OSC. The QA objective selected by the OSC

and its associated requirements determine the QA/QC samples collected in the field. Field QA/QC samples typically include field and trip blanks, replicates (duplicates), matrix spike/matrix spike duplicates, and performance evaluation (PE) samples.

4.2.9 CERCLA Eligibility

Remedial site assessments involve determining CERCLA eligibility, generally prior to the PA reconnaissance. If the site is subject to the corrective action authorities of RCRA Subtitle C, Regional EPA site assessment staff will decide whether to address the site under CERCLA or refer the site to the RCRA program. RCRA Subtitle C sites include currently operating RCRA treatment, storage, or disposal facilities (TSDFs); TSDFs that operated after November 19, 1980; RCRA converters that are former TSFs with current RCRA "generator" or "non-handler" status; and RCRA non-, or late filers. CERCLA authority excludes releases or threatened releases of crude oil, fractions of crude oil, or refined crude oil products; sites that hold a Nuclear Regulatory Commission license; and sites that fall under the jurisdiction of the Atomic Energy Act and the Uranium Mill Tailings Radiation Control Act.

Removal assessments, however, do not require regulatory review for eligibility. In emergencies, EPA responds to all sites; there is no time prior to the investigation to determine eligibility for CERCLA funding. For non-emergencies, the removal program generally assesses CERCLA eligibility, but procedures vary between the Regions. Four Regions note special circumstances to investigate a site that does not fall under CERCLA authority (in most cases these are RCRA-regulated facilities). Survey responders noted that the OSC or other EPA representative, not the contractor, performs eligibility checks.

If EPA concludes that a site is a RCRA-regulated facility, in some Regions OSCs or Site Investigators work with RCRA inspectors to complete the investigation; in others, the RCRA program proceeds alone. The role of the removal program varies depending on hazards present, PRP involvement, and other factors. The OSC's role may be either to investigate imminent threat conditions or emergencies or to assist the complete investigation to assess threat. In emergencies, the OSC performs an assessment, as at other removal sites.

4.2.10 PRP-Lead Sites

If time allows and the PRP is willing and able to respond, OSCs in all Regions provide some oversight and, in some Regions, monitor PRP-lead investigations and actions. Monitoring may consist of field screening for health and safety compliance and concerns, collecting split samples from the PRP, or collecting confirmatory samples. TAT generally supports EPA oversight and may review PRP-prepared work plans or health and safety plans, collect or receive split or confirmatory samples, or document activities for compliance with the NCP and agreements with EPA. Region 7 noted an exception to OSC oversight: the remedial program's Technical Enforcement Services (TES) contractor oversees most PRP activities.

Documentation at PRP-lead sites may consist of POLREPs, photodocumentation, logbooks, and contractor reports. OSCs noted that they must prepare action memoranda for PRP-lead sites, which serve as the basis for enforcement administrative orders as well as contingency planning if the PRP ceases action at the site.

If a site requires emergency action and a PRP has been found, EPA operates as at any other emergency site: EPA's enforcement program seeks payment from the PRP for the work performed at the site. If an emergency arises at an ongoing PRP-lead site, EPA addresses the emergency and seeks to collect costs from the PRP.

4.3 Summary of Regional Issues

Regional survey responses indicated that screening assessment activities and criteria lend themselves to program integration, as these activities vary little between the removal and remedial programs. The surveys identified areas where the programs are different:

- The removal program must feasibly and cost-effectively address the objectives of a removal action, which focuses on limited and specific threats, whereas the remedial program must evaluate specific factors and threats of the HRS.
- Survey respondents indicated that although a typical removal assessment does not currently require all HRS evaluation criteria, they could collect the data if provided with HRS guidance and training plus additional time and resources.
- Both programs have similar sampling objectives, but the removal program collects samples to better define extent of known and suspected threats and identify treatment and disposal options. The remedial program investigates all possible threats to four pathways and narrows them down to the most significant.
- The removal program collects samples to evaluate treatment and disposal options.
- The removal program uses composite samples for determination of threat, whereas composites are not appropriate for some objectives of remedial site assessments.
- Depending on site-specific characteristics, a removal assessment collects fewer than ten to several hundred samples for analysis; the typical remedial SI collects 10 to 20 samples.
- Because of cost considerations and the need for quick turnaround results, the removal program generally utilizes private or ESD laboratories procured by bid process; remedial site assessments analyze most SI samples by the CLP.

- The removal program tracks site activities through the ERNS database, while the remedial program uses CERCLIS (also used by the removal program, but in a more limited scope).

5.0 SUMMARY

EPA conducted this study to examine where the removal and remedial programs perform similar activities or have similar assessment objectives. Regional survey responses and the review of Regional reports support the conclusions that assessment activities and criteria lend themselves to program integration. Except for special training to respond to emergencies, the current technical contract personnel available to both programs should meet program objectives with minimal additional training. Specifically, the potential exists for: (1) integrating removal and remedial PAs and SIs, enabling one field team on one site visit to meet the data requirements of both programs (for non-emergency situations) and to support decisions regarding Superfund response actions; and (2) integrating data usability standards and redefining QA/QC requirements.

5.1 Integrated Site Assessment Implementation Issues

This study identified differences in procedures between the two programs as well as Regional variations within the removal program. The remedial program has national guidance for performing PAs and SIs which ensures collection of the data necessary to complete site evaluations. The removal program has no national guidance, other than the NCP, detailing the specific criteria to be evaluated during removal assessments. Because of the need for flexibility to respond to a range of time-critical conditions, removal sites vary greatly in the methods used to address regulatory criteria. Within the removal program, the Regions vary significantly in methods and procedures; the remedial program varies only slightly in assessment procedures within Regions because of the standardized national guidance requirements. Regional differences affect site assessment, notification procedures, and reporting requirements, particularly the use of CERCLIS and ERNS databases.

Tables 2 and 6 summarize sampling decisions and analytical quality assurance objectives of both programs. Assessment integration requires that the data generated by the removal program be validated and accepted for use by the remedial program. Each Region will therefore need to support similar data quality objectives, which will help maintain consistency of site evaluation by the RDT within a Region, as well as between Regions.

5.2 Methods For Achieving SACM Goals

The following guidelines may help to achieve more efficient assessment of Superfund sites:

1. Work concurrently, where possible. Evaluating the need for removal action and remediation can be a single early stage of assessment, and assessment work can continue concurrently with early actions and enforcement or PRP searches. When one program works at a site, the data and samples collected should support the other program.

Specific functions need not be completed before other functions can start. However, documentation required by the NCP must be completed before moving from one phase of assessment to another, and the necessary documentation for both programs must be met.

Integrating assessment functions can cut several years from the assessment and clean-up process by:

- Eliminating duplicative activities during scoping and site characterization (e.g., health and safety, sampling and analysis, administrative activities)
 - Combining assessments to realize efficiencies in site evaluation, reporting, sampling, communication, and early risk reduction
 - Referring SEA sites to the states or other regulatory authorities for further action, as appropriate
2. Minimize the lag time between programs working at a site. If one program uses data generated by another program, then the time taken by the second program to mobilize for the site will be minimal. For example, the initial health and safety plan can be modified for subsequent site work, rather than using time to create a new plan.
 3. Implement the "one-door" concept as far as possible. Many calls received by the NRC are not eligible for response. If emergencies are immediately diverted to the removal program, and only the non-time-critical actions referred to remedial, EPA can manage a large percentage of potential releases early in the process. More inter-program cooperation and prompt and complete notification practices will help facilitate referrals for site assessment.

REFERENCES

- Booz, Allen and Hamilton, Incorporated. 1992. Notes From the Brainstorming Session on Removal/Site Assessment Integration, 1992 Annual Site Assessment National Conference. Prepared for the U.S. Environmental Protection Agency.
- U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response. Piloting the New Superfund Accelerated Cleanup Model... Memorandum from Richard J. Guimond, Assistant Surgeon General, U.S. Public Health Service, dated March 10, 1992.
- U.S. Environmental Protection Agency. 1988. Preliminary Assessment Petition. Office of Emergency and Remedial Response. Publication 9200.5-301FS.
- U.S. Environmental Protection Agency. 1988. Superfund Removal Procedures. Office of Solid Waste and Emergency Response. Directive 9360.0-03B
- U.S. Environmental Protection Agency. 1990. National Oil and Hazardous Substances Pollution Contingency Plan. 40 CFR Part 300. 55 FR 8666, March 8, 1990.
- U.S. Environmental Protection Agency. 1990. Quality Assurance/Quality Control (QA/QC) Guidance for Removal Activities: Sampling, QA/QC Plan and Data Validation Procedures. Office of Solid Waste and Emergency Response. Directive 9360.4-01, interim final.
- U.S. Environmental Protection Agency. 1991. National Functional Guidelines for Organic Data Review. Contract Laboratory Program.
- U.S. Environmental Protection Agency. 1988. Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analysis, Contract Laboratory Program.
- U.S. Environmental Protection Agency. 1991. Guidance for Performing Preliminary Assessments Under CERCLA. Office of Solid Waste and Emergency Response. Directive 9345.0-01A.
- U.S. Environmental Protection Agency, Region XIII, Technical Assistance Team. 1991. Operating Procedures (OP) for Non-CLP Analytical Services.
- U.S. Environmental Protection Agency. 1991. Technical Assistance Team (TAT) Contract Users' Manual. Office of Emergency and Remedial Response. Directive 9360.6-08.
- U.S. Environmental Protection Agency. 1992. Guidance for Performing Site Inspections Under CERCLA. Office of Solid Waste and Emergency Response. Directive 9345.1-05, interim final.

- U.S. Environmental Protection Agency. 1992. Superfund Accelerated Cleanup Model (SACM). Don R. Clay Memorandum, April 7, 1992. Office of Solid Waste and Emergency Response. Directive 9203.1-01.
- U.S. Environmental Protection Agency. 1992. Guidance on Implementation of the Superfund Accelerated Cleanup Model (SACM) Under CERCLA and the NCP. Don R. Clay and Lisa Friedman Memorandum, July 7, 1992. Office of Solid Waste and Emergency Response and Office of General Counsel. Directive 9203.1-03.
- U.S. Environmental Protection Agency. 1992. Transmittal of SACM Short Sheets (9203.1 - 051). Henry L. Longest II and Bruce Diamond Memorandum, December 31, 1992. Office of Emergency and Remedial Response and Office of Waste Programs Enforcement. Publication 9203.1-05I, Volume 1, Numbers 1 - 5.
- U.S. Environmental Protection Agency. Guidance for Data Usability in Site Assessment (in development). Office of Solid Waste and Emergency Response. Directive 9345.1-06.

SUPPLEMENTAL REFERENCES

Regional Assessment Reports:

- Colorado Department of Health, Hazardous Materials and Waste Management Division. 1990. Preliminary Assessment Colorado Fireworks Specialties aka Loveland Fireworks, Loveland, CO.
- U.S. Environmental Protection Agency, Region VII, Field Investigation Team. 1989. Preliminary Assessment Leavenworth Junkyard Site, Leavenworth, KS. TDD No. F-07-8809-10.
- U.S. Environmental Protection Agency, Region VIII, Field Investigation Team. 1989. Final Westchem Warehouse Preliminary Assessment, Minot, ND. TDD No. F08-8904-13.
- U.S. Environmental Protection Agency, Region IV. 1990. Harlan County Drum Site Investigation Report, Atlanta, GA.
- U.S. Environmental Protection Agency, Region VII, Field Investigation Team. 1990. Final Report Screening Site Inspection at Leavenworth Junkyard Site, Leavenworth, KS. TDD No. F-07-8903-013.
- U.S. Environmental Protection Agency, Region VII. 1990. Removal Assessment for Leavenworth Junkyard, Leavenworth, KS.
- U.S. Environmental Protection Agency, Region I, Technical Assistance Team. 1991. PA/SI Report, Stamina Mills Site, N. Smithfield, RI.

- U.S. Environmental Protection Agency, Region II. 1991. Federal On-Scene Coordinator's Report, 37 Aqueduct Street, Ossining, NY.
- U.S. Environmental Protection Agency, Region IV. 1991. Harlan County Drum Site Removal Report, Atlanta, GA.
- U.S. Environmental Protection Agency, Region XII, Technical Assistance Team. 1991. FIT Survey.
- U.S. Environmental Protection Agency, Region I, Alternative Remedial Contracting Strategy. 1992. Task Work Plan for On-Site Reconnaissance and Sampling at Geer Brothers Septic, Waterford, CT. TDD No. 9105-72-AWS.
- U.S. Environmental Protection Agency, Region I, Alternative Remedial Contracting Strategy. 1992. Trip Report for On-Site Reconnaissance and Soil Sampling at Jefferson Garden Apartments, New London, CT. TDD No. 9105-73-AWS.
- U.S. Environmental Protection Agency, Region I, Technical Assistance Team. 1992. After Action Report, Stamina Mills Site, N. Smithfield, RI.

Removal program staff in the following Regions responded to a technical survey:

Region 1	Three EPA and three TAT responses.
Region 2	Three TAT responses.
Region 3	Three TAT responses.
Region 4	One EPA and one TAT response.
Region 5	One TAT response.
Region 6	Two EPA and one TAT response.
Region 7	One EPA and one TAT response.
Region 8	One EPA and one TAT response.
Region 9	Two EPA and one TAT response.
Region 10	One TAT response.

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