

Site Assessment

Overview

The environmental management process typically begins with an environmental site assessment, but may include many steps, and requires the services of an experienced professional.

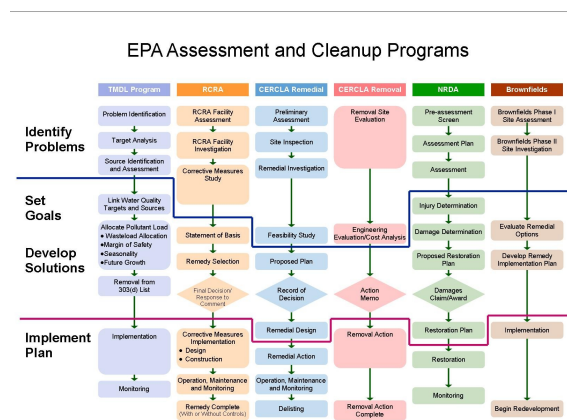
A thorough site assessment that includes an evaluation of the current condition of the property, the operational history of the facility, and the processes used to discover this information should be conducted early in the revitalization process. Accurate characterization of environmental conditions is required to estimate potential costs associated with site cleanup and regulatory negotiation.

Environmental costs can represent a significant financial issue impacting the success or start of a revitalization project. In the event that significant contamination exists, communication with local regulatory agencies is important and should include discussion of impacts to project schedule.

The information in this section can assist in identifying potential environmental concerns and addresses the following topic areas: [EPA Brownfields Road Map](#), [Infrastructure Considerations](#), [All Appropriate Inquiry](#), [Environmental Schedule](#), [Resources and Tools](#).

Overview of Assessment and Cleanup Programs

Depending on the regulatory status of the site as defined by Federal, state, and local regulatory requirements most sites are required to follow a prescribed assessment and cleanup program. The following chart illustrates the process of the various assessment and cleanup programs.



- Total Maximum Daily Load (TMDL) sites are those with regulated discharges subject to the Clean Water Act.
- Resource Conservation and Recovery Act (RCRA) sites are those with RCRA operating permits.

- Comprehensive Environmental Response and Liability Act (CERCLA) sites are those on the Superfund list (or based on State or Federal policy subject to the Superfund approach).
- Natural Resource Damage Assessment (NRDA) sites are those with injured natural resources that result from oil spills and hazardous substance releases. Regulations have been promulgated under both CERCLA and the Oil Pollution Act (OPA).
- Brownfield sites make up the balance and predominance of sites and the focus of this website. [Phase I](#) and [Phase II](#) site assessments are described in greater detail later in this section.

The following are explanations of each program listed in the figure:

[Total Maximum Daily Load \(TMDL\)](#) is a calculation of the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards, and an allocation of that amount to the pollutant's sources. By law, EPA must approve or disapprove pollutant lists and TMDLs established by states, territories, and authorized tribes. If a state, territory, or authorized tribe submission is inadequate, EPA must establish the pollutant lists and TMDLs. The Clean Water Act, section 303, establishes the water quality standards and TMDL programs.

The [Resource Conservation and Recovery Act \(RCRA\)](#) regulates hazardous and non-hazardous wastes. RCRA Subtitle C establishes a system for controlling hazardous waste from the time it is generated until its ultimate disposal. Facilities that generate, treat, store, or dispose of hazardous waste are regulated under Subtitle C.

RCRA Subtitle C has two general paths to protecting human health and the environment:

1. Preventing environmental problems by ensuring that wastes are well managed from "cradle to grave," reducing the amount of waste generated, conserving energy and natural resources
2. Cleaning up environmental problems caused by the mismanagement of wastes

The RCRA Corrective Action program, part of Subtitle C, addresses when action is needed to clean up contamination at a facility. RCRA corrective action usually takes place at facilities that treat, store, or dispose of hazardous waste. Corrective action may be prompted through the enforcement mechanisms found in RCRA, through a RCRA permit, or through voluntary agreements. Corrective action can take place while a facility continues operating.

The [Comprehensive Environmental Response, Compensation, and Liability Act \(CERCLA\)](#), commonly known as Superfund, was enacted by Congress on December 11, 1980. This law created a tax on the chemical and petroleum industries and provided broad Federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment. Over five years, \$1.6 billion was collected and the tax went to a trust fund for cleaning up abandoned or uncontrolled hazardous waste sites. In general, CERCLA:

- Establishes prohibitions and requirements concerning closed and abandoned hazardous waste sites
- Provides for liability of persons responsible for releases of hazardous waste at these sites
- Establishes a trust fund to provide for cleanup when no responsible party could be identified

The law authorizes two kinds of response actions:

1. Short-term removals, where actions may be taken to address releases or threatened releases requiring prompt response.
2. Long-term remedial response actions, that permanently and significantly reduce the dangers associated with releases or threats of releases of hazardous substances that are serious, but not immediately life threatening. These actions can be conducted only at sites listed on EPA's [National Priorities List](#) (NPL).

<http://www.epa.gov/superfund/sites/npl/index.htm> conducts studies to identify the extent of resource injuries, the best methods for restoring those resources, and the type and amount of restoration required after an oil spill or hazardous substance release.

The Small Business Liability Relief and Brownfields Revitalization Act (Public Law 107-118; H.R. 2869) expands [EPA's Brownfields Program](#), boosts funding for assessment and cleanup, enhances roles for state and tribal response programs, and clarifies superfund liability.

Under [State Voluntary Cleanup Programs \(VCPs\)](#), private parties that voluntarily agree to clean up a contaminated site are offered some protection from future state enforcement action at the site, often in the form of a “no further action” letter, covenant not to sue, or “certificate of completion” from the state. Such state commitments do not affect EPA’s authority to respond to actual or threatened releases of hazardous substances under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

A brownfield property is "real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant." Brownfields revitalization provides communities with the tools to reduce environmental and health risks, reuse abandoned properties, take advantage of existing infrastructure, create a robust tax base, attract new businesses and jobs, create new recreational areas, and reduce the pressure to develop open spaces. It is important for borrowers that receive EPA brownfields grant funds to understand that all work must be performed in compliance with [All Appropriate Inquiry \(AAI\)](#).

EPA Brownfields Road Map

The [Road Map to Understanding Innovative Technology Options for Brownfields Investigation and Cleanup](#), (EPA, 2001) includes resources to assist in the identification and selection of innovative site characterization and cleanup technologies for site revitalization. The Road Map provides a generally applicable outline of the steps involved in the cleanup of a site slated for revitalization and introduces revitalization stakeholders to the range of innovative technology options and resources available to them. The [Road Map](#) provides valuable information to a wide range of stakeholders involved in or affected by the revitalization of sites, whether public projects, private developments, or public-private partnerships including:

- New and less experienced stakeholders learn about EPA’s brownfields program in general.
- Decision makers who are familiar with the revitalization programs but are also interested in obtaining more detailed information about technologies. The Road Map provides these users with current and up-to-date information about the applicability of innovative technologies and ready access to the latest resources that can assist them in making their technology decisions.

- Stakeholders that hire or oversee site cleanup professionals (such as environmental consultants, cleanup contractors, technology vendors, or staff of analytical laboratories). The Road Map provides these stakeholders with a detailed understanding of the different phases of cleanup of a revitalization site and provides information about the role these professionals play in the process and how to encourage consideration of the use of innovative technologies.
- Regulators by increasing their understanding of the brownfields program and the advantages innovative technologies and approaches may provide throughout the cleanup process. The Road Map also serves as a resource for regulators to provide site owners, service providers, and other stakeholders with useful information about the brownfields program.
- Community members by providing information about the general cleanup process and guidelines and mechanisms that ensure that they are involved in the decision-making process.
- Other stakeholders, such as financial institutions and insurance agencies, by providing information for use in assessing and minimizing risk associated with revitalization.

The [Road Map](#) is not an official guidance document. Instead, it draws upon EPA's experience with Superfund sites, corrective action sites under RCRA, and UST sites. Specific conditions-such as the type and extent of contamination, the proposed reuses of the property, the financial resources available, and the level of support from neighboring communities-vary from site to site.

For sites requiring remediation, the seamless combination of remedial activities and the approach used to restore the site to beneficial reuse requires detailed planning to address a variety of considerations. Effective revitalization teams will comprise professionals from a variety of disciplines. Revitalization projects require those involved to consider issues related to the property's past, present and its future simultaneously. The process involves carefully balancing regulatory and budgetary issues associated with resolving the site's potential environmental issues against the scheduling and financial issues associated with successful revitalization. The environmental cleanup when appropriate should be interwoven with the planned future use. The aggressive project schedules associated with revitalization projects should be tempered by the requirements for environmental cleanup.

In addition to site environmental issues, there are multiple political and regulatory considerations that may influence the prospects for revitalization of any specific property. The number and importance of these considerations, or any one of them, depends on the type of reuse being considered. Generally, industrial, residential, or large-scaled commercial uses present the most complex matrix of considerations. In addition to the potential contamination of soil and structures on a property, the following environmental concerns and conditions may need to be evaluated:

- Air quality and transportation congestion
- Probability of obtaining required permits
- Water quality (quality of groundwater and surface water, for example, lakes, rivers, estuaries, etc.)
- Stormwater management
- Probability of obtaining direct discharge permits and pretreatment costs, if discharge into a public sewerage system is planned

- Drinking water quality
- Vapor intrusion from residual subsurface contamination by volatile compounds
- Wetlands preservation
- Availability and cost of land filling demolition debris
- Availability, quality, and cost of water needed for industrial processes
- Availability and cost of solid waste and hazardous waste disposal
- Ambient noise and noise standards

The interplay among these environmental conditions and the federal, state, and local regulatory requirements can significantly impact the potential reuses of property. Furthermore, the planned use of the property, whether residential, industrial, or mixed use, all have different requirements and implications on the above environmental conditions.

Infrastructure Considerations

The presence and condition of suitable infrastructure (for example, roads, buildings, utilities, etc.) is an important element for successful revitalization. Revitalization teams should complete a detailed analysis of the existing infrastructure. The review should focus on the current condition of the infrastructure; the suitability of using portions or all of the existing infrastructure for the new site use; the quality of the materials used to construct the components of the infrastructure; future tenant requirements; and site specific environmental and engineering requirements.

Additionally, infrastructure requirements can be considered in concert with developing an environmental risk management approach. Examples include:

- Using a roadway as a cap to minimize exposure to residual contamination
- Factoring the extent and distribution of contaminants in infrastructure and facility design. For example, matching excavation design specifications to building design specifications to maximize or minimize the removal of contaminated soil
- Using infrastructure funding to co-fund environmental remediation

At sites with existing or planned cleanup, additional consideration will be required to determine infrastructure requirements necessary to accommodate those activities. Recent developments in urban planning promote the incorporation of environmental cleanup systems in revitalization plans. Such efforts may require specific infrastructure to support their operation and should consider the following factors:

- Handling and disposal of liquid, vapor, and solid waste generated
- Regulatory requirements associated with treatment, storage, disposal, and discharge

- Safety of the operation relative to planned reuse
- Increased infrastructure capacity and operational requirements
- Required [institutional and engineering controls](#) maintained in a manner that assures the regulatory agencies that they will remain protective as long as needed

All Appropriate Inquiry

The Small Business Liability Relief and Revitalization Act (the Brownfields Amendments) clarifies CERCLA liability provisions for certain landowners and potential property owners. The Brownfields Amendments provide liability protections for certain property owners, if the property owners comply with specific provisions outlined in the statute, including a requirement for conducting all appropriate inquiries into present and past uses of the property and the potential presence of environmental contamination on the property. EPA has established specific regulatory requirements and standards for conducting an assessment of the environmental conditions of a property prior to its acquisition, known as [All Appropriate Inquiries](#) (AAI); this information may also be available in local or state files.

Many of the properties targeted for revitalization already have some environmental history associated with them. As a result of the requirement for due diligence, properties that have been involved in recent transactions may have been subjected to some level of environmental assessment. All aspects of a site assessment, or all appropriate inquiries investigation, completed more than one year prior to the date of acquisition of the subject property must be updated to reflect current conditions and current property-specific information. Revitalization teams can benefit from environmental investigations completed in support of previously closed or failed transactions; municipal, state and federal records; and anecdotal information from individuals knowledgeable with regard to the operational history of the site. However, it is important to note that all properties need to have environmental due diligence efforts conducted for revitalization efforts in order to obtain financing or to qualify for landowner liability protections under CERCLA. Revitalization teams should contact site owners to obtain previous environmental assessment reports, if any.

EPA's final AAI rule (*40 CFR Part 312*) was released on November 1, 2005. The federal rule, which recognizes the current industry standard (ASTM E 1527-05) as an acceptable guidance document, took effect on November 1, 2006. The ASTM International standard was revised to be at least as stringent as *40 CFR 312*. Some key differences between the two documents remain. However, a property purchaser using a qualified environmental professional may follow either the revised E 1527-05 standard or the AAI rule in order to meet the first step necessary to qualify for CERCLA liability protection.

The [ASTM International Guidance Site Assessment Documents Exhibit](#) presents standard guidance documents that ASTM has published for use in site revitalization. These resources, and additional applicable resources, can be purchased through [ASTM International's Web Site](#). At this time, the ASTM International website is the only known official source for purchasing ASTM International methods.

Phase I Environmental Site Assessment

Site assessments known as Phase I environmental site assessments completed in accordance with ASTM International or AAI (some States' regulations will supersede ASTM International) will include information regarding abutting and adjacent sites that may be valuable sources of information to stakeholders during the early stages of environmental investigation. This information can be critical to the development of an accurate characterization of the condition of the surrounding properties and ultimately to the accurate estimation of costs associated with environmental cleanup. Stakeholders may encounter challenges in getting adjacent property owners to release results of prior environmental assessments due to concerns about liability. Partnering with adjacent property owners and marketing the positive impact of the revitalization can help improve the flow of information.

Thorough evaluation of the effectiveness and operating history of existing remediation systems associated with corrective action at the site is also required. Design and operation of previously-installed remedial technologies may not have been successful for a variety of reasons. Revitalization efforts may have to allow for the continuation of existing remedial activities. As with any industry, environmental technologies have advanced significantly in recent years with regard to the accurate and cost-effective assessment and cleanup of potentially contaminated sites. It is possible that a site with a prohibitively expensive cost to cleanup using traditional technology may be addressed more cost-effectively with innovative technologies now available.

Developing a thorough understanding of the regulatory aspects of site revitalization is as critical to the project success as the physical assessment of the site. Early in the revitalization process stakeholders should have a clear understanding of the current regulatory status of the property, the regulatory environment under which the project will be completed, existence of previously established land use controls (such as, deed restrictions) and potential future regulatory requirements impacting the planned reuse.

There is the possibility for potentially contaminated sites to be subject to regulation under a variety of programs. It is essential to the revitalization process that the regulatory history, status, and potential future impact be researched in detail to prevent costly project delays and/or “deal breaker” issues. This information is summarized in the Phase I Environmental Assessment Report. Federal, state, and local agencies with environmental jurisdiction maintain records that provide a “road map” of the regulatory direction the site has traveled and that the revitalization team will have to navigate. In some cases, multiple agencies may be involved in environmental regulation of the site. For example in California, the Department of Toxic Substances Control and the State Water Resources Control Board share jurisdiction over cleanups. EPA may layer responsibilities on as well, such as under the Toxic Substances Control Act, which is not delegated to states. Resource trustees are included when the federal and state government are designated to determine impacts and compensation in the case of natural resource damages (often water resources).

After determining the regulatory framework associated with the specific site of interest to the revitalization team, a preliminary assessment is required ([see All Appropriate Inquiry](#)). The development of a regulatory history for the site, consistent with ASTM International Guidelines, will provide the revitalization team with data regarding the actions necessary to address site-specific regulatory issues. Critical data includes information about the site and surrounding property solicited from the EPA and applicable state agencies as well as a number of local agencies. To determine if any

CERCLA sites, hazardous waste generators, or hazardous materials spills were reported or EPA-regulated establishments are present in the vicinity of the subject site, revitalization teams should review information from several databases and lists compiled by the EPA, the state regulatory agency and municipal sources. Specifically, a review should include the [Comprehensive Environmental Response, Compensation and Liability Information System \(CERCLIS\)](#); [National Priorities List \(NPL\)](#); [Resource Conservation and Recovery Act \(RCRA\) database](#); Facility Index System (FINDS); [Emergency Response Notification System \(ERNS\)](#); [Facility Registry System](#); and [underground storage tank \(UST\)](#), landfill, well records, and environmental enforcement databases. State resources include “State Superfund” lists, Leaking Underground Storage Tank (LUST) databases, and state waste disposal permit files. Local resources include information solicited from municipal regulatory agencies. These resources include local environmental health department files, building and demolition permit records, fire department incident files, and files maintained by the zoning and planning departments. Environmental database searches, including information from the above-referenced federal and state databases, are available from private sources for a nominal fee. These database searches meet ASTM International and other standards as part of an environmental file review.

Phase II Environmental Site Assessment

Data collected during the Phase I environmental site assessment may conclude that contaminant(s) may exist at the site and that further study is necessary to determine the extent of contamination. The purpose of a Phase II environmental site investigation is to give planners and decision-makers objective and credible data about the contamination at a brownfields site to help them develop an appropriate contaminant management strategy. A site investigation is typically conducted by an environmental professional. This process evaluates the following types of data:

- Types of contamination present
- Cleanup and reuse goals
- Length of time required to reach cleanup goals
- Post-treatment care needed
- Costs

Data gathering in a site investigation may typically include soil, water, and air sampling to identify the types, quantity, and extent of contamination in these various environmental media. The types of data used in a site investigation can vary from compiling existing site data (if adequate), to conducting limited sampling of the site, to mounting an extensive contaminant-specific or site-specific sampling effort. Planners should use knowledge of past facility operations whenever possible to focus the site evaluation on those process areas where pollutants were stored, handled, used, or disposed. These will be the areas where potential contamination will be most readily identified. Generally, to minimize costs, a site investigation begins with limited sampling (assuming readily available data does not adequately characterize the type and extent of contamination on the site) and proceed to more comprehensive sampling if needed (for example, if the initial sampling could not identify the geographical limits of contamination). The [EPA Environmental Technology Verification \(ETV\) Program](#) and the [Clean Up Information Network \(CLUIN.org\)](#) provides links to information regarding

various site sampling, monitoring and characterization technologies, along with contact information for verified vendors that provide them.

A multi-disciplined team that can address the environmental aspects of the project should include individuals who have expertise in chemistry, geochemistry, geology, hydrogeology, biology, toxicology, civil engineering, and soil sciences. Depending upon site-specific conditions and potential for remediation options, other expertise also may be required. Specialized expertise may be required to conduct environmental and public health risk assessments, operate models, or perform complicated statistical analyses ([EPA, 2002](#)).

FRTR

The Federal Remediation Technologies Roundtable (FRTR) offers a [Field Sampling and Analysis Technologies Matrix](#) for use in identifying methods involving non-intrusive or minimally intrusive technologies in order to optimize sampling locations and minimize well installation. The Matrix includes techniques and instruments that are (1) fieldable and (2) commercially available. The *Reference Guide* provides a description and additional background information on each technology. Member agencies of the FRTR are working jointly to make data more widely available on real experiences and lessons learned in selecting and implementing treatment and site characterization technologies to clean up soil and groundwater contamination at hazardous waste sites. They provide [remediation case study reports, remediation technology assessment reports, and technology cost analysis links](#).

The Triad Approach

One such innovative approach to conducting an environmental site assessment is the Triad Approach, also called Investigation Process Optimization (IPO), which can be used to effectively plan an expedited yet effective approach to investigation, clean up, and revitalization. This approach incorporates advancing science, technology, and lessons-learned from the field. The three elements of the Triad Approach includes systemic project planning, dynamic work strategies, and real-time measurement technologies, which are integrated to attain more efficient and affordable project management. By including ‘if-then’ approaches in dynamic work plans, scientifically sound site models can be developed and corrected in real-time, streamlining site activities—cutting life-cycle costs and lifespan by a third, a half, or more. Systematic planning keeps all concerned parties informed, involved, and focused on project objectives during the entire cleanup process. Additional information can be found at the [Triad Resource Center](#). Triad user experiences featuring the application of Triad at various sites in the U.S. can be found at www.triadcentral.org/user/index.cfm.

SW-846

The EPA publication [SW-846, entitled Test Methods for Evaluating Solid Waste, Physical/Chemical Methods](#), provides analytical and sampling methods that have been evaluated and approved by the EPA for use in complying with the RCRA regulations. SW-846 functions primarily as a guidance document setting forth acceptable, although not required, methods for the regulated and regulatory communities to use in responding to RCRA-related sampling and analysis requirements. It contains procedures for

field and laboratory quality control, sampling, determining hazardous constituents in wastes, determining the hazardous characteristics of wastes (toxicity, ignitability, reactivity, and corrosivity), and for determining physical properties of wastes. It also provides direction on how to select appropriate methods.

QAPP

A [Quality Assurance Project Plan \(QAPP\)](#) describes the plan for collecting and using environmental data. It documents the planning, implementation, and assessment procedures for a particular project, as well as any specific quality assurance, quality control activities, and other technical activities. It increases the likelihood that the results of the work performed will satisfy the stated performance criteria needed for a specific decision or use. A QAPP is project specific. All work performed or funded by EPA that involves the acquisition of environmental data must have an EPA approved QAPP.

The EPA [Quality Assurance Guidance for Brownfields Site Assessments](#) documents important quality assurance concepts and issues, and provides a road map to Brownfields site managers for identifying the type and quality of environmental data needed to present a clear picture of the site's environmental conditions.

Environmental Schedule

There can be a number of issues impacting the progress and success of environmental assessment and cleanup activities that are unknown at the start of the revitalization project. Detailed planning and the development of a dynamic, critical path schedule can limit project delays due to environmental activities. The participation of revitalization team members from a variety of areas of expertise will ensure that the environmental schedule is developed in a manner that promotes smooth transition among environmental and revitalization activities.

The sequencing of issues related to specific media (soil or groundwater) may vary based upon priorities. A detailed timeline and schedule for the work should be developed. The schedule should include all major project milestones with a critical path analysis of the impact associated with environmental issues. Some issues to consider include:

- Environmental Work Plans, [Quality Assurance Project Plan \(QAPP\)](#), Health and Safety Plan (HASP), and Revitalization Plan Preparation, review and approval
- Permitting approvals
- Environmental sampling activities, site infrastructure inspection and improvement
- Report preparation and review
- Remediation alternative screening, selection, and approval
- Coordination of environmental activities with other site activities
- Contingency planning to rapidly address unanticipated conditions. For example, if procedures are in

place to address leaking underground storage tanks (USTs) that may be found during development, such findings will not slow the overall schedule.

Contaminated sites may require flexibility and continual adjustment and modification of the team schedule and methodologies. Each step should be justified and defensible from an environmental, regulatory, and financial standpoint, and in keeping with the focus of the planned reuse.

There are several means by which developers can work with environmental regulators to reduce the time to achieve cleanup and reuse of potentially contaminated sites. These include:

- Using private sector parties to perform oversight roles previously performed by agency staff under a voluntary cleanup program
- Allowing phased or partial site cleanups (this is the approach often incorporated into state voluntary cleanup programs) as approved by project stakeholders including regulatory agencies
- Coordinating the permitting process under all applicable regulatory programs
- Providing for timely participation by the locally affected public in the administrative review process
- Prioritizing cleanup of conditions that most threaten public health and, if unattended, are most likely to aggravate ultimate cleanup costs
- Conducting voluntary cleanups in accordance with approved state or local VCPs
- Incorporating remediation into the revitalization plan
- Obtaining a “No Further Action” letter or equivalent contingent upon revitalization
- Modifying the agency review process (local governmental representatives and revitalization coordinators can assist with this)

Resources and Tools

This section presents guidance and tool resources related to site assessment.

EPA Guidance

EPA has developed many tools and resources to help in the revitalization process, including information about: beginning a revitalization project, assessing a site, investigating a site, cleanup options, cleanup design and implementation, incentives, and regulations. In addition, many states and other stakeholders have also developed useful materials. A list of some of the policies and documents developed by EPA is presented in the EPA Guidance and Documents Exhibit. These documents are available through EPA’s [Office of Solid Waste and Emergency Response, Brownfields Web Site](#).

Exhibit: EPA Guidance Documents

<i>Topic</i>	<i>Document Title</i>	<i>Summary</i>
Site Assessment and Cleanup	Technical Approaches to Characterizing and Cleaning up Brownfields Sites EPA, November 2001	This guidance document gives assistance to communities, decision-makers, states and municipalities, academia, and the private sector to address issues related to the redevelopment of Brownfield sites. The document helps users to understand the problems associated with redevelopment of these sites, the sources of information which may help to assess the sites, the regulatory groups which should be involved in the process. The guidance has appendices of relevant terms, references, and applicable technologies.
State Voluntary Cleanup Programs	Interim Approaches for Regional Relations with State Voluntary Cleanup Programs , November 14, 1996. Current Memoranda of Agreements (MOA) on State Voluntary Cleanup Programs (VCP) .	More than 35 states now have voluntary clean up programs (VCPs) under which private parties that voluntarily agree to clean up a contaminated site are offered some protection from future state enforcement action at the site, often in the form of a “no further action” letter, covenant not to sue, or “certificate of completion” from the state. Such state commitments do not affect EPA’s authority to respond to actual or threatened releases of hazardous substances under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

ASTM Guidance

ASTM a not-for-profit organization, provides a forum for the development and publication of voluntary consensus standards for materials, products, systems, and services. More than 32,000 members representing producers, users, ultimate consumers, and representatives of government and academia from over 100 countries develop documents that serve as a basis for manufacturing, procurement, and regulatory activities.

ASTM develops standard test methods, specifications, practices, guides, classifications, and terminology in 130 areas covering subjects such as metals, paints, plastics, textiles, petroleum, construction, energy, the environment, consumer products, medical services and devices, computerized systems, electronics, and many others. ASTM has no technical research or testing facilities; such work is done voluntarily by the ASTM members located throughout the world.

The ASTM Site Assessment Guidance Documents Exhibit presents standard guidance documents that ASTM has published for use in site revitalization. These resources, and additional applicable resources, can be purchased through [ASTM’s Web Site](#). At this time, the ASTM website is the only known official source for purchasing ASTM methods.

Exhibit: ASTM Site Assessment Guidance Documents

<i>Topic</i>	<i>Document Title</i>	<i>Summary</i>
Phase I Environmental Site Assessment	<u>ASTM Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process</u> (ASTM E1527-05)	Defines commercial and customary practices in the U.S. for conducting initial Phase I Environmental Site Assessments of commercial real estate with respect to the range of contaminants within the scope of CERCLA and to petroleum products. However, some state requirements may supersede ASTM standards.
Phase II Environmental Site Assessment	<u>ASTM Standard Guide for Environmental Site Assessments: Phase II Environmental Site Assessment Process</u> (ASTM E1903-97)	Discusses the framework for employing good commercial and customary practices in the U.S. when conducting Phase II environmental site assessments of commercial property with respect to the potential presence of a range of contaminants within the scope of CERCLA, as well as petroleum products. Phase II assessments are more detailed assessments that address the recommendations of a Phase I assessment.
Accelerated Site Characterization	<u>ASTM Standard Guide for Accelerated Site Characterization for Confirmed or Suspected Petroleum Releases</u> (ASTM E1912-98)	Describes accelerated site characterization (ASC), a process used to rapidly and accurately characterize confirmed or suspected releases of petroleum. The guide provides a framework that responsible parties, contractors, consultants, and regulators can use to streamline and accelerate site characterization.
Risk-Based Corrective Action (RBCA)	<u>Standard Guide for Risk-Based Corrective Action</u> (ASTM E2081-00(2004)e1)	Discusses risk-based corrective action (RBCA) at chemical release sites based on protecting human health and the environment. The RBCA is a consistent decision-making process for the assessment and response to chemical releases. The guide will assist brownfields decision makers who wish to become familiar with another approach that can be used to assess environmental risk at a site, in conformity with applicable federal, state, local, and tribal regulations. The diversity and flexibility of a RBCA approach is defined and discussed, and the tiered approach of the process is summarized. Although the RBCA process is not limited to a particular site, the guide emphasizes the use of RBCA in response to releases of petroleum.

<i>Topic</i>	<i>Document Title</i>	<i>Summary</i>
Risk-Based Corrective Action (RBCA)	<u>ASTM Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites</u> (ASTM E1739-95e1)	Defines RBCA as a process for assessing and responding to a petroleum release in a manner that ensures the protection of human health and the environment. The guide will assist brownfields decision makers who wish to become familiar with another approach that can be used to assess environmental risk at a site, in conformity with applicable federal, state, local, and tribal regulations. The diversity and flexibility of a RBCA approach is defined and discussed, and the tiered approach of the process is summarized. Although the RBCA process is not limited to a particular site, the guide emphasizes the use of RBCA in response to releases of petroleum.
Phase I Environmental Site Assessment for Forestland or Rural Property	<u>ASTM Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process for Forestland or Rural Property</u> (ASTM E2247-02)	Defines good commercial and customary practices in the U.S. for conducting a Phase I environmental site assessment of a property 120 acres or greater of forestland or rural property or with a developed use of only managed forestland and/or agriculture with respect to the range of contaminants within the scope of CERCLA and to petroleum products.
Limited Environmental Due Diligence	<u>Standard Practice for Limited Environmental Due Diligence: Transaction Screen Process</u> (ASTM E1528-06)	Defines good commercial and customary practices in the U.S. for conducting a transaction screen for a parcel of commercial real estate where the user wishes to conduct limited environmental due diligence
Remediation of Ground Water by Natural Attenuation	<u>Standard Guide for Remediation of Ground Water by Natural Attenuation at Petroleum Release Sites</u> (ASTM E1943-98(2004))	Discusses the appropriateness of remediation by natural attenuation and implementing remediation by natural attenuation at a given petroleum release site, either as a stand alone remedial action or in combination with other remedial actions.

Sampling and Analysis Tools

A variety of sampling and analysis tools are available on a variety of platforms. The [Sampling and Analysis Tools Exhibit](#) provides a list of some of these tools, a description of their use, and applicability.

Exhibit: Sampling and Analysis Tools

Tool	Description	Applicability
<u>Multimedia Integrated Modeling System (MIMS)</u>	<p>The Multimedia Integrated Modeling System (MIMS) is a modeling framework designed to integrate various modeling tools, databases and a graphical user interface (GUI). MIMS framework relies on the Dynamic Information Architecture System (DIAS) to couple and manage the various modeling and database software applications. The Council on Regulatory Environmental Modeling is looking to MIMS to provide a common modeling framework for EPA.</p>	<p>Sampling design and integrated strategy is developed by a multi-talented team of professionals to establish data quality objectives that will promote cost effective sampling and analysis that will satisfy the requirements of the many stakeholders and regulators involved in the project. Greater control of the uncertainties associated with environmental sampling and analysis is the goal. Limiting uncertainties associated with data of unknown quality also supports more confident development decisions.</p>

Tool	Description	Applicability
<p><u>Fully Integrated Environmental Location and Decision Support (FIELDS) and Rapid Assessment Tools Software (RATS)</u></p>	<p>FIELDS is an <u>ArcView</u> software extension whose mission is to “identify, assess, communicate and help solve priority environmental problems in specific geographic areas.” FIELDS is designed to help: identify and delineate the area of concern; manage and analyze the historical data from the site; design surveys to characterize the contamination or fill data gaps; analyze and visualize the data; assess the associated human health and environmental risk; determine goals and design and evaluate alternative solutions; communicate the problem and solutions to the agency and the public; design, monitor and evaluate the chosen solution.</p>	<p>FIELDS applies the technology of an expert system to integrate administrative and professional intelligence with the technical capacity of ArcView 2.1. It has a built-in machine learning mechanism to enable users to accumulate knowledge or obtain insights from past system experience for formulating analytical tasks. With this added functionality, the system provides powerful analytic tools and flexible query builders for examining pollutant issues under various scenarios in priority geographic areas. The system also includes a customized field-data-entry module to facilitate in-field sampling activities.</p>

Tool	Description	Applicability
<u>Modeling Subsurface Transport of Petroleum Hydrocarbons Web Site</u>	<p>The objective of this web course is to provide the necessary background information for applying models to field sites, judging such applications, or for setting program-wide modeling requirements. The course is divided into two parts of equal importance: Fate and Transport of Contaminants and Model Application</p>	<p>On-Site calculators have a variety of applications. The models are used to simulate transport from fuel or pulse sources that are highly self-contained. Required inputs and necessary databases are directly linked to the calculators. The components of the models are available as separate calculators which can be used for planning site investigations, preparing model input parameters, reviewing modeling reports, or for assessing contaminant impacts at sites.</p>
<u>Onsite Online Calculators for Subsurface Contaminant Transport Site Assessment</u>	<p>EPA has developed a suite of on-line calculators called “OnSite” for assessing transport of environmental contaminants in the subsurface. The purpose of these calculators is to provide methods and data for common calculations used in assessing impacts from subsurface contamination. The calculators are divided into four categories: 1) Parameter Estimates, 2) Simple Transport Models, 3) Unit Conversions, 4) Scientific Demos.</p>	<p>Parameter estimates are included in OnSite for the convenience of experienced personnel, the education of inexperienced personnel, and for the potential to provide consistency among a diverse user community. The simple transport models were developed for two purposes — to demonstrate concepts of groundwater flow and contaminant transport and to calculate concentrations given a set of input parameters. Unit conversions were provided for unit sets unique to subsurface transport calculations. The scientific demos were outgrowths of modeling courses, where general concepts of transport need to be introduced.</p>

Tool	Description	Applicability
Visual Sampling Plan	Developed by U.S. Department of Energy Pacific Northwest National Laboratory to provide simple, defensible tools for defining an optimal, technically defensible sampling scheme for characterization.	Provides statistical solutions to sampling design to help users decide where samples should be collected and how many are needed. Applicable for two-dimensional sampling plan including surface soil, building surfaces, water bodies, or other similar applications.
Scribe: Environmental Field Data Capture	Scribe is a software tool developed by the USEPA's Environmental Response Team (ERT) to assist in the process of managing environmental data. Scribe captures sampling, observational, and monitoring field data. Examples of Scribe field tasks include Soil Sampling, Water Sampling, Air Sampling and Biota Sampling. Scribe can import electronic data including Analytical Lab Result data (EDD) and Sampling Location data such as GPS. Scribe supports handheld extensions, <i>Scriplets</i> , to capture and import sampling and monitoring data collected on handheld PDAs.	Scribe outputs include labels for collected samples, Chain of Custody generation and Analytical Lab Result data reports. Scribe provides a flexible user interface to manage, query and view all this information. Scribe supports exporting electronic data for user services such as GIS tools and spreadsheets so sampling data may be further analyzed and incorporated into report writing and deliverables.