



## Glossary

### A

#### **adaptive remedial strategy**

A strategy that is designed to achieve interim objectives within a prescribed timeframe at a site. The selected strategy might include a mix of engineered/constructed remedies, natural attenuation, or institutional controls applied to specific media or site segments over time to stabilize and improve site conditions.

#### **adaptive site management**

An approach to resource management in which policies are implemented with the express recognition that the response of the system is uncertain, but with the intent that this response will be monitored, interpreted, and used to adjust programs in an iterative manner, leading to ongoing improvements in knowledge and performance ([NRC 2003](#)).

#### **alternate concentration limits (ACLs)**

Limits for a hazardous constituent as allowed by 40 CFR 264.94(a)(3) where the constituent will not pose a substantial present or potential hazard to human health or the environment as long as the alternate concentration limit is not exceeded. Factors to consider in developing an ACL are listed in §40 CFR 264.94 (b).

For purposes of groundwater monitoring, hazardous constituent limits established by the USEPA Regional Administrator that are allowed to be present in groundwater ([USEPA 2014c](#)).

#### **Applicable or Relevant and Appropriate Requirements (ARARs)**

As defined in the NCP (40 CFR §300.5), the term “applicable requirements” means those site objectives, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. Only those state standards that are identified by a state in a timely manner and that are more stringent than federal requirements may be applicable. The term “relevant and appropriate requirements” means those site objectives, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that, while not ‘applicable’ to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site. Only those state standards that are identified in a timely manner and are more stringent than federal requirements may be relevant and appropriate.

#### **asymptotic**

A line that is the limit to a curve. As the curve approaches the asymptote, the distance separating the curve and the asymptote continues to decrease, but the curve never actually intersects the asymptote ([USEPA 2004c](#)).

### B

#### **background levels**

An amount of a substance that occurs naturally in the environment ([Agency for Toxic Substances and Disease Registry 2016](#)).

#### **baseline site conditions**

Needed initial analytical data that have been measured at a site and serve as the basis or points of comparison for assessing or predicting remedy performance.

### C

#### **closure**

See definition of “site closure”

#### **comingled plumes**

Two or more plumes of contaminated groundwater from different sources that have blended together ([Enviroforensics 2014](#)).

**complex site**

A site where remedial approaches are not anticipated to bring the site to closure or facilitate transitioning to sustainable long-term management within a reasonable time frame. The National Research Council describes complex sites as follows: "Although progress has been made in remediating many hazardous waste sites, there remains a sizeable population of complex sites, where restoration is likely not achievable in the next 50-100 years. Although there is no formal definition of complexity, most remediation professionals agree that attributes include areally extensive groundwater contamination, heterogeneous geology, large releases and/or source zones, multiple and/or recalcitrant contaminants, heterogeneous contaminant distribution in the subsurface, and long time frames since releases occurred. Additional factors that contribute to complexity include restrictions on the physical placement or operation of remedial technologies and challenging expectations (e.g., regulatory requirements, cleanup goals, community expectations). The complexity of a site increases with the number of these characteristics present" ([NRC 2013](#)).

**Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**

An Act of Congress passed in 1980 and amended by the Superfund Amendments and Reauthorization Act of 1986, to authorize the assessment and remediation of hazardous substances, pollutants, or contaminants that have been released into the environment.

**conceptual site model (CSM)**

"An iterative, 'living representation' of a site that summarizes and helps project teams visualize and understand available information" ([USEPA 2011a](#)).

**construction completion**

A Superfund program milestone that indicates that all physical construction of all remedial actions for a site are complete, including actions to address all immediate threats and to bring all long-term threats under control ([USEPA 2011b](#)).

**contaminants of concern (COCs)**

Contaminants in an ecosystem that may have an effect on that or other environments. These may consist of chemicals, biota, natural features or any other thing that could affect the area of concern.

**contingency remedy**

A remedy that has been prepared as a contingency plan, to be implemented if the contingency criteria occur.

**criteria adjustment**

A change in remediation standards as deemed necessary by site conditions.

**D****data quality objectives (DQOs)**

Needed performance and acceptance criteria, which serve as the basis for designing a plan for collecting data of sufficient quality and quantity to support the goals of the study. ([USEPA 2006a](#)).

**decision document**

A public site-specific document that outlines the course of action for remediation. Examples include a CERCLA Record of Decision, RCRA permit modification, or equivalent documentation.

**designated points of compliance**

The locations where enforcement limits for contaminants of concern have been set and are not to be exceeded.

**F****Feasibility Study (FS)**

As defined in the NCP (40 CFR §300.5): An FS means a study undertaken by the lead agency to develop and evaluate options for remedial action. The FS emphasizes data analysis and is generally performed concurrently and in an interactive fashion with the remedial investigation (RI), using data gathered during the RI. The RI data are used to define the objectives of the remedial action, to develop remedial action alternatives, and to undertake an initial screening, and detailed analysis of the alternatives. The term also refers to a report that describes the results of the study.

**Five-Year Reviews**

Five-Year Reviews generally are required by CERCLA or program policy when hazardous substances remain on site above levels which allow for UU/UE. Five-year reviews provide an opportunity to evaluate the implementation and performance of a remedy to determine whether it remains protective of human health and the environment.

Generally, reviews are performed five years following the initiation of a CERCLA remedial action, and are repeated every five years so long as future uses remain restricted. Five-year reviews can be performed by USEPA or the lead agency for a site, but USEPA retains responsibility for determining the protectiveness of the remedy ([USEPA 2001b](#)).

### **Focused Feasibility Study (FFS)**

A feasibility study “under which fewer alternative options would be studied...consistent with the NCP (see § 300.430(e)(1))” ([NCP 1990](#)).

### **front end**

In relations to the site remediation process, “front end” is defined as before a final remedy has been identified and implemented ([USEPA 1993](#)).

## **G**

### **Groundwater Remedy Completion Strategy**

A recommended site-specific course of actions and decision-making processes to achieve site objectives for groundwater and associated remediation objectives using an updated CSM, performance metrics and data derived from site-specific remedy evaluations ([USEPA 2014b](#)).

## **I**

### **institutional controls (ICs)**

Nonengineered instruments, such as administrative and legal controls, to help minimize the potential for human exposure to contamination and/or protect the integrity of a remedial action. They are typically used in conjunction with, or as a supplement to, other measures, such as waste treatment or containment. There are generally four categories of ICs: governmental controls; proprietary controls; enforcement and permit tools with IC components; and information devices ([USEPA 2012a](#)).

### **integrated site characterization (ISC)**

A process for improving the efficiency and effectiveness of characterization efforts at a site. The specific steps in an ISC process are as follows: (1) Define the problem and uncertainties in the CSM. (2) Identify the data gaps and spatial resolution required in the investigation. (3) Establish the data collection objectives. (4) Design the data collection process. (5) Select the appropriate investigative tools. (6) Manage, evaluate, and interpret the data ([ITRC 2015b](#)).

### **interim measures**

Measures used to address risks to human health or the environment in advance of final remedy selection. Interim measures control, minimize or eliminate releases that pose actual or potential threats to human health and the environment.

### **interim objective**

Intermediary goals that guide progress towards achieving site objectives.

## **L**

### **long time frame**

This is a general term that does not have a specific definition or legal meaning. The maximum assumed remediation time frame is typically 30 years for cost estimating purposes. At complex sites, remediation time frame estimates may exceed 100 years. When used in the context of remediation technologies, a long time frame may be relative; one technology may require more time compared to another technology.

### **long-term management**

A phase in remediation programs that typically includes post-construction phases of remediation management, monitoring and evaluation of remedy protectiveness.

### **long-term management plan**

A living document outlining the remedy components, interim objectives, performance metrics, basis for predicting performance and decision criteria, schedule and basis for periodic evaluations and decision logic for remedy evaluation, optimization, modification or transition. The plan can be revised based on periodic performance evaluations.

## **M**

### **maximum contaminant level (MCL)**

Drinking water standards established under the Safe Drinking Water Act which as ARARs typically represent remediation objectives at CERCLA sites. “MCLs are set at levels that are protective of human health, and are set as close to MCLGs as is feasible taking into account available treatment technologies and the costs to large public water systems.” Consistent with CERCLA and the NCP, MCLs typically are relevant and appropriate when establishing remediation objectives for contaminated groundwater that is or may be used as drinking water ([USEPA 1988](#)).

**maximum contaminant level goals (MCLG)**

“Strictly health-based levels established under the Safe Drinking Water Act that do not take cost or feasibility into account. As health goals, MCLGs are established at levels at which no known or anticipated adverse effects on the health of persons occur and which allow an adequate margin of safety” ([USEPA 1988](#)).

**milestone**

An action or event marking a significant change or stage in development of a project.

**monitored natural attenuation (MNA)**

Typically, physical or biological processes (unassisted by human intervention) that will “attain cleanup levels (or other site objectives) in a timeframe that is reasonable when compared to the remediation timeframes of the other alternatives and when compared to the timeframe of the anticipated resource use” ([USEPA 1999b](#)).

**N**

**National Priorities List (NPL)**

The NPL means the list, compiled by USEPA pursuant to CERCLA section 105, of uncontrolled hazardous substance releases in the US that are priorities for long-term remedial evaluation and response (40 CFR 300.5).

**O**

**operation and maintenance (O&M)**

“Activities required to maintain the effectiveness and integrity of a remedy; in the case of Fund-financed measures to restore groundwater or surface water, O&M refers to the continued operation of such measures beyond the LTRA (long-term response action) period until cleanup levels are achieved” ([USEPA 2011b](#)).

**optimization**

“Efforts at any phase of the removal or remedial response to identify and implement specific actions that improve the effectiveness and cost-efficiency of that phase” ([USEPA 2012c](#)).

**optimization review**

An optimization review considers the goals of the remedy, available site data, the conceptual site model (CSM), remedy performance and exit strategy. Optimization review activities include: examining site documents, interviewing site stakeholders, potentially visiting the site, evaluating site data, developing findings and recommendations and compiling a report for the purposes of project documentation and technology transfer ([USEPA 2013e](#)).

**P**

**partial cleanup**

A cleanup remediation in which current conditions meet adequate standards to protect human health and the environment where groundwater contamination is either not present, or is present at concentrations where further groundwater cleanup remediation is unnecessary at this time to be protective.

**performance metrics**

Site-specific remedy performance criteria typically used to evaluate remedy performance and measure progress towards achieving interim objectives (such as effluent discharge concentrations, contaminant concentrations trends, and hydrogeologic parameters).

**performance model**

A predictive graphic model or other predictive software model or tool (such as statistical application and numeric/analytical software models) that describes the expected performance of the remedial approach over time. Performance models are used to project future progress towards the attainment of the interim and site objectives. Performance models/prediction tools demonstrate, quantify, track, and support the evaluation of remedy progress.

**periodic evaluation**

A scheduled evaluation of remedy performance where actual performance is compared with predicted performance

towards meeting interim objectives.

**point of compliance**

For groundwater, the point of compliance represents where a facility should achieve specified groundwater quality criteria to satisfy facility-specific cleanup goals ([Adapted from USEPA 1996](#)).

**postremedy implementation**

Implementation of a remediation management tool or approach (for example, technical impracticability waiver, or remediation potential assessment) after a remedy has already been selected, as during long-term management phase of site operations.

**practicable**

Capable of being accomplished. In remediation, often used to describe the limitations of proven remediation technology performance and the current state of practice.

**prevent**

A term that may be used in site or interim objectives to describe stopping the release of hazardous substances, pollutants or contaminants so that they do not migrate to cause substantial danger to present or future public health or welfare or the environment (from CERCLA Section 101(24)).

**pump-and-treat (P&T) systems**

Groundwater remedies consisting of groundwater extraction, above ground treatment, disposal of treated water, groundwater monitoring in the subsurface to determine if remediation objectives are decreasing or have been achieved, and process monitoring of the treatment plant ([USEPA 2002a](#)).

**R**

**reasonable time frame**

The amount of time which is necessary to restore resources to beneficial use, as circumstances permit. This term is used in the NCP and is subject to legal interpretation: "EPA expects to return usable ground waters to their beneficial uses wherever practicable, **within a timeframe that is reasonable**, given the particular circumstances of the site" (40 CFR 300.430(a)(1)(iii)(F)). The amount of time that is considered reasonable depends on the particular circumstances of the site and the remediation method employed. The NCP also stated: "For groundwater response actions, the lead agency shall develop a limited number of remedial alternatives that attain site-specific remediation goals within different remediation periods utilizing one or more different technologies." Thus, a comparison of remediation alternatives from most aggressive to passive (natural attenuation) will provide information concerning the approximate range of time periods needed to attain groundwater remediation objectives. Although remediation timeframe is an important consideration, no single time period can be specified which would be considered excessively long for all site conditions ([USEPA 1993](#)).

**Record of Decision (ROD)**

As described in USEPA's 1999 ROD guidance: "The ROD documents the remedial action plan for a site or operable unit and serves the following three basic functions: (1) it certifies that the remedy selection process was carried out in accordance with CERCLA and, to the extent practicable, with the NCP; (2) it describes the technical parameters of the remedy, specifying the methods selected to protect human health and the environment including treatment, engineering, and ICs components, as well as remediation objectives; and (3) it provides the public with a consolidated summary of information about the site and the chosen remedy, including the rationale behind the selection" ([USEPA 1999a](#)).

**remedial action**

RA means those actions consistent with permanent remedy taken instead of, or in addition to, removal action in the event of a release or threatened release of a hazardous substance into the environment, to prevent or minimize the release of hazardous substances so that they do not migrate to cause substantial danger to present or future public health and welfare, or the environment (40 CFR 300.50).

**remedial action objectives (RAOs)**

For CERCLA sites, RAOs specify "contaminants and media of concern, potential exposure pathways, and site objectives" (40 CFR 300.430(e)(2)(i)). Consistent with the NCP, "RAOs are designed to provide a general description of what the cleanup will accomplish (e.g., remediation of groundwater to drinking water levels)" ([USEPA 1999a](#)).

Specific goals for protecting human health and the environment. RAOs are developed by evaluating Applicable or relevant and Appropriate Requirements (ARARs) that are protective of human health and the environment and the results of the remedial investigations, including the human and ecological risk assessments.

Cleanup goals for a selected remedial action. Preliminary RAOs are often developed during the Preliminary Assessment/Site Investigation phase of a munitions response, and are refined into definitive RAOs during the course of the Remedial Investigation/Feasibility Study process. Final RAOs are documented in the Record of Decision or Decision Document. Remediation efforts are considered complete upon attainment of the RAOs.

**remedial alternatives**

Solutions used in place of original remediation strategies to ensure that site cleanup objectives are met.

**remedial approach**

A combination of remedial technologies and other approaches to remediate a site and ultimately achieve site objectives.

**remedial design**

The technical analysis and procedures which follow the selection of remedy for a site and result in a detailed set of plans and specifications for implementation of the remedial action (40 CFR 300.5).

**remedial investigation (RI)**

The RI is a process undertaken by the lead agency to determine the nature and extent of the problem presented by the release. The RI emphasizes data collection and site characterization, and is generally performed concurrently and in an interactive fashion with the FS. The RI includes sampling and monitoring, as necessary, and includes the gathering of sufficient information to determine the necessity for remedial action and to support the evaluation of remedial alternatives (40 CFR 300.5).

**remediation**

The act or process of abating, cleaning up, containing, or removing a substance (usually hazardous or infectious) from an environment.

**remediation management**

The process of managing site remediation to ultimately achieve site objectives while protecting human health and the environment. Remediation management occurs at all stages of the remedial process and includes but is not limited to, evaluating, selecting, and implementing a site-specific remedial approach and overseeing remedy operation and maintenance, monitoring programs, and remedy adjustments during long-term management.

**remediation potential**

The possibilities that exist of using technology to remove or clean up hazardous constituents that have been released into the environment.

**remediation potential assessment**

A tool used to identify a site's remediation potential and to help evaluate whether adaptive site management is needed.

**remediation time frame**

The time between implementing a final remedy and achieving all site objectives.

**remediation time frame analysis**

A study of the amount time required to meet site cleanup goals.

**remedy completion strategy**

A recommended site-specific course of action(s) and decision-making process(es) to achieve site objectives for groundwater and associated cleanup levels using an updated conceptual site model, performance metrics and data derived from site-specific remedy evaluations ([USEPA 2014b](#)).

**remedy component**

A technology or other approach such as deed restrictions that is used as part of the overall site remedy to remediate a site and maintain protection of human health and environment.

**remedy performance**

How well a selected technology is progressing to meet site cleanup goals.

**restoration**

Generally speaking, the process of returning resources to beneficial uses and the reduction of contaminant concentrations to levels that ensure protectiveness of human health and the environment, consistent with Superfund or RCRA Corrective Action programs. For groundwater, a term is used to describe "returning usable ground waters to their beneficial uses wherever practicable, within a timeframe that is reasonable given the particular circumstances of the site" (40 CFR 300.430(a)(1)(iii)(F)). For groundwater currently or potentially used for drinking water purposes, these levels may be MCLs or non-zero MCLGs established under the SDWA; state MCLs or other cleanup requirements; or risk- based levels for compounds not covered by specific state or federal MCLs or

MCLGs. Other remediation objectives may be appropriate for groundwater used or potentially used for non-drinking purposes ([USEPA 1993](#)).

### **risk assessment**

An organized process used to describe and estimate the likelihood of adverse health outcomes from environmental exposures to chemicals. The four steps are hazard identification, dose-response assessment, exposure assessment, and risk characterization ([The Presidential/Congressional Commission on Risk Assessment and Risk Management 1997a](#)).

The risk assessment is the evaluation of the human health and environmental risks presented by the release and potential release of hazardous substances from a site. The risk assessment (1) provides an analysis of baseline risks and helps determine the need for action; (2) provides a basis for determining levels of chemicals that can remain on site and still be adequately protective of public health and the environment; (3) provides a basis for comparing potential health and environmental impacts of various remedial alternatives; and (4) provides a consistent process for evaluating and documenting public health and environmental threats ([USEPA 1989b](#)).

### **risk-based criteria**

Site-specific clean up objectives that have been derived from human health or ecological risk based data.

## **S**

### **schedule adjustment**

For this document, changes allowed in a schedule to meet site objectives.

### **site closure**

Generally, closing sites under RCRA corrective action or under CERCLA will satisfy requirements of both programs. At many complex sites, both regulatory programs will be coordinated and jointly applied.

Under CERCLA, site completion typically occurs when it is determined that no further response is required at the site, all cleanup levels have been achieved, appropriate controls are in place and the site is deemed protective of human health and the environment ([USEPA 2011b, e](#)).

When closing units or facilities under RCRA, two approaches are possible: (1) clean closure, where owners remove all wastes from the unit and decontaminate or remove all equipment, structures, and surrounding soils; or (2) closing with the waste in place ("closure as a landfill"), which is the required closure method for hazardous waste management units that cannot meet the clean closure requirements ([USEPA 2017a](#)).

### **site objective**

The overall expectations for a site, inclusive of protecting human health and the environment. Site objectives may include meeting applicable or relevant and appropriate Federal and State requirements or standards (ARARs), achieving target risk levels, or other objectives to protect human health and the environment.

### **site segment**

Where a whole site or plume is divided into discrete subsets that are candidates for different remediation management strategies.

### **stakeholders**

Public stakeholders may include citizens, community, or environmental advocacy members, or members of the affected public. Tribal stakeholders may include Native Americans, Alaska natives, Native Hawaiians, or persons affiliated with or are employees of Native American tribes. USEPA defines the term stakeholders to include "people or communities who are affected by an agency's work, who have influence or power over it, or have an interest in its successful or unsuccessful conclusion. This includes people and communities with the power to either to block or advance an agency's work ([USEPA 2016d](#)). In general, the term includes anyone who has a "stake" in the development, outcome or decisions made as a result of a risk assessment. A stakeholder can be a person, group or an organization that is either affected, potentially affected, or has any interest in the project or in the project's outcome, either directly or indirectly ([The Presidential/Congressional Commission on Risk Assessment and Risk Management 1997a, b](#), [NRC 1996](#)).

## **T**

### **technical impracticability (TI)**

An ARAR waiver that may be authorized under CERCLA. The TI waiver may be appropriate when compliance with an ARAR specified in a ROD "is technically impracticable from an engineering perspective" (40 CFR 300.430(f)(2)(ii)(C)(3)).



**technology adjustment**

For this document, changes in technology to meet site objectives.

**TI determination**

Specific guidance established by USEPA for evaluating the technical impracticability of attaining groundwater clean-up criteria and establishing alternative, protective remedial strategies where restoration to a criterion is not practicable. Impracticability of achieving the criterion may be demonstrated through factors such as hydrogeologic, contaminant-related, remedial technology limitations, or others ([USEPA 1993](#)).

**time-bound**

Criteria or standards that have a time constraint.

**transition assessment**

An analysis similar to a focused feasibility study that considers alternatives for site management—choosing a new remedy or transitioning to long-term management (such as monitored natural attenuation) or the other alternative approaches ([NRC 2013](#)).

**treatment train**

A sequence of independent treatment technologies designed to collectively address different aspects of site contamination.

**U****unlimited use/unrestricted exposure (UU/UE)**

No restrictions on the potential use of land or other natural resources (40 CFR 300.430.4.ii). Such restrictions may be temporarily (over the short-term or long-term) placed on land or resources to protect human health and environment.