



Technical Outreach Services for Communities (TOSC)



After a site is listed on the NPL, a remedial investigation/feasibility study (RI/FS) is performed at the site. The remedial investigation (RI) serves as the mechanism for collecting data to:

- characterize site conditions;
- determine the nature of the waste;
- assess risk to human health and the environment; and
- conduct treatability testing to evaluate the potential performance and cost of the treatment technologies that are being considered.

The feasibility study (FS) is the mechanism for the development, screening, and detailed evaluation of alternative remedial actions. The RI and FS are conducted concurrently — data collected in the RI influence the development of remedial alternatives in the FS, which in turn affect the data needs and scope of treatability studies and additional field investigations. This phased approach encourages the continual scoping of the site characterization effort, which minimizes the collection of unnecessary data and maximizes data quality.

The RI/FS process includes these phases:

- Scoping;
- Site Characterization;
- Development and Screening of Alternatives;
- Treatability Investigations;
- Detailed Analysis.

Each phase is described in more detail in the following pages.

Scoping

Scoping is the initial planning phase of the RI/FS process. Many of the planning steps begun here are continued and refined in later phases of the RI/FS. Scoping activities typically begin with the collection of existing site data, including data from previous investigations such as the preliminary assessment (PA) and site inspection (SI). On the basis of this information, site management planning is undertaken in order to:

- preliminarily identify boundaries of the study area;
- identify likely remedial action objectives and whether interim actions may be necessary or appropriate; and
- establish whether the site may best be remedied as one or several separate operable units.

Once an overall management strategy is agreed upon, the RI/FS for a specific project or the site as a whole is planned. Typical scoping activities include:

- Initiating the identification and discussion of potential Applicable or Relevant and Appropriate Requirements (ARARs) with the support agency.
- Determining the types of decisions to be made and identifying the data and other information needed to support these decisions.
- Assembling a technical advisory committee to assist in activities, serve as a review board for important deliverables, and monitor progress during the study.
- Preparing the work plan, sampling and analysis plan, health and safety plan, and community relations plan.

Site Characterization

Field sampling and laboratory analyses are initiated during the site characterization phase of the RI/FS. A preliminary site characterization summary is prepared to provide the lead agency with information on the site early in the process before preparation of the full remedial investigation (RI) report. This summary is useful in determining the feasibility

of potential technologies and in assisting both the lead and support agencies with the initial identification of Applicable or Relevant and Appropriate Requirements (ARARs). The summary can also be sent to the Agency for Toxic Substances and Disease Registry (ATSDR) to assist them in performing their health assessments.

A baseline risk assessment is developed to identify the existing or potential risks that may be posed to human health and the environment by the site. Because this assessment identifies the primary health and environmental threats at the site, it also provides valuable input to the development and evaluation of alternatives during the feasibility study (FS).

Development and Screening of Alternatives

The development of alternatives phase of the RI/FS process usually begins during scoping when likely response scenarios may first be identified. The development of alternatives requires:

- identifying remedial action objectives;
- identifying potential treatment, resource recovery, and containment technologies that will satisfy these objectives;
- screening the technologies based on their effectiveness, implementability, and cost; and
- assembling technologies and their associated containment or disposal requirements into alternatives for the contaminated media at the site or for the operable unit.

Alternatives can be developed to address contaminated medium, a specific area of the site, or the entire site.

Once potential alternatives have been developed, it may be necessary to screen out certain options to reduce the number of alternatives that will be analyzed. The screening process involves evaluating alternatives with respect to their effectiveness,

implementability, and cost. It is usually done on a general basis and with limited resources, because the information necessary to fully evaluate the alternatives may not be complete at this point in the process.

Treatability Investigations

Treatability investigations are the next to the last phase of the RI/FS process. Treatability investigations are conducted primarily to:

- provide sufficient data to allow treatment alternatives to be fully developed and evaluated during the analysis phase and to support the remedial design of selected alternatives, and
- reduce cost and performance uncertainties for treatment alternatives to acceptable levels so that a remedy can be selected.

Detailed Analysis

Detailed analysis is the last phase of the RI/FS process. Once sufficient data are available, alternatives are evaluated in detail with respect to nine evaluation criteria that the Agency has developed to address the statutory requirements and preferences of CERCLA. The nine criteria include:

- overall protection of human health and the environment;
- compliance with ARARs;
- long-term effectiveness and permanence;
- reduction of toxicity, mobility, or volume;
- short-term effectiveness;
- implementability;
- cost; and
- State and Community acceptance.

The alternatives are analyzed individually against each criterion and then compared against one another to determine their respective strengths and weaknesses and to identify the key trade-offs that must be balanced for the site. The results of the detailed analysis are summarized so that an appropriate remedy consistent with CERCLA can be selected.



This factsheet has been compiled by TOSC using information available on the U.S. EPA website. The TOSC program promotes effective citizen involvement in site cleanup projects by providing independent technical expertise to communities. Funded under a U.S. EPA grant, TOSC is housed in the Great Lakes and Mid-Atlantic Center (GLMAC) for Hazardous Substance Research. The GLMAC comprises three leading research universities: The University of Michigan, Michigan State University and Howard University. For more information, contact Kirk Riley at (800) 490-3890 or send e-mail to tosc@egr.msu.edu