

BCRLF Engineering Evaluation/Cost Analysis

The goals of the BCRLF engineering evaluation and cost analysis (EE/CA) are to identify the objectives of the removal action and to analyze the effectiveness, implementability, and cost of various alternatives that may satisfy the objectives. The EE/CA is a flexible document tailored to the scope, goals and objectives of the non-time-critical removal action. It should contain only those data necessary to support the selection of a response alternative, and rely upon existing documentation whenever possible. The EE/CA should provide definitive information on the source, nature and extent of contamination, and risks presented by the site. Specific objectives, generally consisting of environmental medium-specific goals for protecting human health and the environment, should be developed for the site. The objectives should be as specific as possible, but not so specific that the range of alternatives that can be developed is unduly limited. Removal action objectives should identify the contaminants of concern, exposure route(s) and receptor(s).

The scope of the non-time-critical removal action and the specific objectives determine the information to be collected during the EE/CA. Data to characterize the nature and extent of contamination should be limited to those needed to support the specific objectives of the non-time-critical removal action, supplementing existing data to the extent appropriate. The viable alternatives relevant to the EE/CA objectives should be identified and analyzed.

EE/CA Components:

- I. **Executive Summary:** The EE/CA Executive Summary provides a general overview of the contents of the EE/CA. It should contain a brief discussion of the site and the current or potential threat posed by site conditions. The Executive Summary should also identify the objectives of the removal action, as well as the removal action alternatives. Finally, this section should provide information on the recommended removal action alternatives.
- II. **Site Characterization:** The EE/CA should summarize available data on the physical, demographic and other characteristics of the site and surrounding areas.
 - A. **Site description and background:** The site description includes current and historical information. This information may help identify hazardous substances, pollutants, or contaminants of concern, or areas of the site requiring additional sampling. The site description section of the EE/CA should include the following types of information where available and as appropriate to the site-specific conditions and the scope of the removal action:
 1. Site Location
 - a. Street address and crossroads
 - b. USGS topographic map quadrangle
 - c. Latitude/Longitude
 2. Type of facility and operational status
 - a. Materials manufactured, stored or disposed on-site

- B.** Previous removal actions: The site characterization section of the EE/CA should also describe any previous removal actions at the site. Previous information, if relevant, may be organized as follows:
1. The scope and objectives of the previous removal action
 2. The amount of time spent on the previous removal action
 3. The nature and extent of hazardous substances, pollutants or contaminants treated or controlled during the previous removal action
 4. The technologies used and/or treatment levels used for the previous removal action.
- C.** Source, nature and extent of contamination: To the extent possible, site characterization data should be gathered to support the EE/CA.
1. Location(s) of hazardous substance(s), pollutant(s), or contaminant(s)
 2. Quantity, volume, size or magnitude of the contamination
 3. Physical and chemical attribute(s) of the hazardous substance(s), pollutant(s), or contaminant(s)
 4. Target(s) potentially affected by the site
- D.** Analytical data: The analytical data section presents quantifiable data collected for the EE/CA. This section begins with existing data and expands as additional data are collected. When sufficient data are collected, significant findings should be presented in a narrative discussion. The actual data can be presented in tables, either within the section or in an appendix, or incorporated by reference to the document containing the data.
- E.** Streamlined risk evaluation: The risk evaluation uses sampling data from the site to identify the chemicals of concern, provides an estimate of how and to what extent people might be exposed to these chemicals, and provides an assessment of the health effects associated with these chemicals. A streamlined risk evaluation projects the potential risk of health problems occurring if no cleanup action is taken at a site.

III. Identification of Removal Action Objectives

- A.** Determination of removal scope: The EE/CA should help define the scope of the removal action. The scope of the action could be, for example, total site cleanup, stabilization, or surface cleanup of hazardous substances. Specific objectives vary with the type of removal. Specific objectives that clearly define the scope of the removal action are particularly important when the site poses multiple hazards and the response actions will be conducted in phases.

- B.** Determination of removal schedule: The general schedule for removal activities, including both the start and completion time for the non-time-critical removal action, should be a part of the EE/CA. The time available before the removal action can be a significant factor in evaluating alternative technologies, since implementing technologies can necessitate considerable lead time. The completion time should also be estimated for the removal action, considering the nature of the threat. It may be necessary to achieve beneficial results within a certain time frame to ensure adequate protection of human health and the environment. The time needed to sample treated wastes or other media prior to disposal should be factored into the schedule. All removal actions funded through the BCRLF should be designed to be completed within 12 months of beginning work at the site.

IV. Identification and Analysis of Removal Action Alternatives: Based on the analysis of the nature and extent of contamination and on the cleanup objectives developed in the previous section, the applicant should identify and assess a limited number of alternatives appropriate for addressing the removal action objectives.

- A.** Effectiveness: The effectiveness of an alternative refers to its ability to meet the objective within the scope of the removal action. This section of the EE/CA should evaluate each alternative against the scope of the removal action and against each specific objective for final disposition of the wastes and the level of cleanup desired. These objectives should be discussed in terms of overall protection of public health and the environment. How well each alternative protects public health and the environment should be discussed in a consistent manner. This discussion draws on assessments conducted under other criteria:
- 1.** Long-term Effectiveness and Permanence: This evaluation assesses the extent and effectiveness of the controls that may be required to manage the risk posed by treatment residuals and/or untreated wastes at the site. The following components should be considered for each alternative:
 - a.** Magnitude of Risk: This criterion looks at the effectiveness of the alternative and assesses the risk from waste and residuals remaining at the conclusion of site activities. This component also evaluates whether the alternative contributes to future remedial objectives.
 - b.** Adequacy and Reliability of Controls: A completed removal action may require post-removal site controls, those response activities necessary to sustain the integrity of a BCRLF-financed removal action following its conclusion.
 - 2.** Reduction of Toxicity, Mobility, or Volume Through Treatment: EPA's policy of preference for treatment (i.e., technologies that will permanently and significantly reduce toxicity, mobility or volume of the hazardous

substances as their principal element) requires evaluation based upon the following subfactors for a particular alternative:

- a. The treatment process(es) employed and the material(s) it will treat
 - b. The amount of the hazardous materials that will be destroyed or treated
 - c. The degree of reduction expected in toxicity, mobility, or volume
 - d. The degree to which the treatment will be irreversible
 - e. The type and quantity of residuals that will remain after treatment
 - f. Whether the alternative will satisfy the preference for treatment
3. Short-Term Effectiveness: The short-term effectiveness criterion addresses the effects of the alternative during implementation before the removal objectives have been met. Alternatives should also be evaluated with respect to their effects on human health and the environment following implementation. The following factors should be addressed as appropriate for each alternative:
- a. Protection of the community: This factor addresses any risk to the affected community that results from implementation of the proposed action, whether from air quality impacts, fugitive dusts, transportation of hazardous materials, or other sources.
 - b. Protection of the Workers: This factor assesses any threats to site workers and the effectiveness and reliability of protective measures that would be taken.
 - c. Environmental Impacts: This factor evaluates the potential adverse environmental impacts from the implementation of each alternative. The factor also assesses the reliability of mitigation measures in preventing or reducing the potential impacts.
 - d. Time Until Response Objectives are Achieved: This factor estimates the time needed to achieve protection for the site itself or for individual elements or threats associated with the site.
4. Compliance with applicable or relevant and appropriate requirements (ARARs): Section 300.415(I) of the NCP requires that BCRLF Fund-financed removal actions under CERCLA section 104 and removal actions pursuant to CERCLA section 106 attain ARARs under Federal or state environmental laws or facility siting laws, to the extent practicable considering the urgency of the situation and the scope of the removal. At certain sites, ARARs may form the basis of the removal action objectives.
5. Ability to Achieve Removal Objectives:
- a. Level of treatment/containment expected
 - b. No residual effect concerns
 - c. Will maintain and control until long-term solution implemented

B. Implementability: The implementability criterion addresses the technical and administrative feasibility of implementing an alternative and the availability of various services and materials required during its implementation. The following areas should be considered:

1. Technical Feasibility
 - a. Construction and operational considerations
 - b. Demonstrated performance/useful life
 - c. Adaptable to environmental conditions
 - d. Contributes to remedial performance
 - e. Can be implemented in 1 year
2. Availability
 - a. Equipment
 - b. Personnel and services
 - c. Outside laboratory testing capacity
 - d. Off-site treatment and disposal capacity
 - e. Post-Removal Site Control
3. Administrative Feasibility
 - a. Permits required
 - b. Easements or right-of-ways required
 - c. Impact on adjoining property
 - d. Ability to impose institutional controls

V. **Comparative Analysis of Removal Action Alternatives**: Once the alternatives have been described and individually assessed against the criteria, a comparative analysis should be conducted to evaluate the relative performance of each alternative in relation to each criteria. This is in contrast to the preceding analysis in which each alternative was analyzed independently without consideration of other alternatives. The purpose of the comparative analysis is to identify the advantages and disadvantages of each alternative relative to one another so that key tradeoffs that would affect the remedy selection can be identified.

VI. **Recommended Removal Action Alternative**: The EE/CA should identify the action that best satisfies the evaluation criteria based on the comparative analysis in the previous section. This description should briefly describe the evaluation process used to develop the recommended action. This determination may be placed in the administrative record file concurrently with the EE/CA. This section of the EE/CA may enhance public involvement efforts by describing clearly why the alternative was recommended.