Expediting Cleanup through Early Identification of Likely Response Actions

This guide is primarily intended for personnel with line management responsibility for Department of Energy (DOE) environmental restoration (ER) projects conducted pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Resource Conservation and Recovery Act (RCRA). It describes how Principle 3: *Early identification of likely response actions is possible, prudent, and necessary*, when integrated with the other three DOE/EPA "Principles of Environmental Restoration," will streamline the remedy selection process and enhance cleanup decisions.

Introduction

Early identification of likely response actions, and the implementation of those responses as soon as sufficient site information is available to do so, can significantly decrease the costs and accelerate the schedules of environmental restoration projects. During project scoping, the definition of site problems and identification of associated likely response actions allows an early focus on an appropriate remediation strategy.[1] This focus on response strategy improves data collection by ensuring generated data serve to discriminate between viable alternatives and, ultimately, support design of the selected response. This focus does not preclude a broad technology evaluation, nor discount innovative technologies. By focusing on likely response actions, DOE and its regulators may reach early consensus on the most promising technologies, including innovative solutions, as appropriate. This focus also promotes earlier and more meaningful involvement of the public and other key stakeholders.

Identifying An Appropriate Range of Likely Response Actions

The core team (DOE, EPA, and State Project Managers) should begin identifying likely response actions during project scoping as site problems are identified and defined in the site conceptual model.[2] [NOTE: This emphasis on problem identification / definition is critical to ensure all the agencies agree on the specific condition(s) requiring action, and the basis for those actions (e.g., preclude further migration of contaminants to ground water)].

The range of likely responses considered should be based upon the scope, characteristics, and complexity of site problem(s) but equally importantly, take into account the extensive information available on the performance capabilities of remedial technologies (e.g., DOE's preferred technology matrices, EPA's remediation technology screening matrices) to quickly settle on a discrete set of truly viable responses. In addition, the core team should capitalize on knowledge gained from previous experiences whenever possible by utilizing the following considerations:

- *__Determine whether an existing EPA presumptive remedy is applicable to site-specific conditions__* (i.e., site conditions fit within the pre-determined response parameters) [OSWER Fact Sheet 9355.0-47FS, September 1993, EPA 540-F-93-047];

- *__Determine whether an EPA presumptive remedy can be "bridged"__* If site-specific circumstances are similar, but include an additional aspect (e.g., physical condition, presence of contaminant) not specifically considered by the presumptive remedy, a presumptive remedy can be "bridged" given sufficient information / analysis justifies the use of the presumptive remedy and any corresponding modifications;

- *__Determine whether a generic approach can be utilized__* If the problem being addressed is recurrent (i.e., waste sites requiring action across the facility are sufficiently similar), it may be appropriate to establish a standardized, pre-approved response strategy [*Expediting Cleanup through Contingent Removal Actions*, DOE/EH/(CERCLA)-003, March 1997], or develop a site / remedy profile to streamline remedial planning and implementation through a "plug-in" approach [*The Plug-In Approach: A Generic Strategy to Expediting Cleanup*, DOE/EH-413-9903, May 1999].

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[1] As used here, a site problem is a site condition where no additional evaluation is considered necessary to determine some type of response is required to address an actual or perceived risk to human health and the environment. [See related fact sheet, *Expediting Cleanup through Problem Definition and Identification*.]

[2] See related fact sheet, *Expediting Cleanup through a Core Team Approach*.

Developing a Hierarchy of Preferred Response Actions

Once a preliminary range of likely response technologies is identified based on technical applicability, the core team should evaluate the various options based on their general effectiveness, implementability, cost, and any other relevant factors (e.g., desired land use) to establish a "hierarchy" of preferred response actions. In other words, the core team should attempt to identify which response options appear to be the most promising given existing information and the current understanding of site conditions.

A critical component of this evaluation will be the identification of any technical or administrative uncertainties that if encountered prevent implementation of the response, jeopardize the likelihood of achieving response objectives, or trigger a threshold at which the response is no longer cost-effective to implement. These uncertainties, or "fatal flaws," will drive the response selection process in two ways: 1) by focusing investigations / analyses on relevant information to determine whether a given response can be effectively implemented; and 2) serving to refine preferences (as reflected in the initial hierarchy) among responses, until core team consensus is reached on a single, preferred option. In other words, these fatal flaws "pre-define" when a response is not viable and thus specify when the core team should consider alternate responses within the hierarchy, as illustrated in Highlight 1.

As additional information to reduce uncertainties associated with a particular response option is collected (whether through a re-evaluation of existing data or a limited field investigation focused on the specific data needs identified), initial response preferences may shift to reflect an enhanced understanding of site conditions. Even after a preferred response is identified, a further analysis of potential uncertainties may be appropriate to discriminate between process / design options within that technology and to thoroughly evaluate implementation needs, including potential contingency plans to address any deviations to the expected conditions.[3]

Early Public Involvement

As indicated previously, early consensus on a remedial strategy, in addition to streamlining site investigation and analyses, also allows for more meaningful public participation. For example, by taking preliminary agreements (e.g., response action preferences, planned analyses associated with the response preference) to the public for their input <u>before</u> the generation of "formal" reports / documents, DOE may better address their concerns in subsequent activities. The benefit of this approach is two-fold: 1) the public is truly involved in shaping the "direction" of the project (e.g., what options are being evaluated in detail and what supporting analyses are being pursued); and 2) the core team can move forward with confidence, knowing their ongoing activities (whether investigative or designing an agreed to response action) are being conducted with the full knowledge and understanding of their key stakeholders.

HIGHLIGHT 1: Example "Fatal Flaw" Analysis

Based on existing information and the site conceptual model, the core team initially establishes the following hierarchy of preferred responses and potential fatal flaws to address an identified problem (i.e., concentrations of lead in surface soils surrounding Building H116 exceed the State standard for industrial workers). [NOTE: Based on existing information, the core team concludes that a potential deviation to the expected condition (of lead being the only contaminant posing a risk and thus requiring a response) is the possible presence of volatile organics.]

1) <u>Excavate, solidify / stabilize, dispose</u>
- Concentrations of volatile organics above 50 ppb could result in vapors which would likely pose an unacceptable health and safety hazard to workers and nearby residents during excavation;

2) <u>In-situ solidification / stabilization</u>
- Presence of volatile organics above 50 ppb would prevent complete and uniform mixing of the binder with the contaminated matrix;
- Underground obstructions or geology (e.g., presence of boulders) preclude application of technology;

3) <u>Cap in place</u>
- Anticipated future land use involves intrusive activity or precludes effective long-term maintenance of cap;
- Unstable geologic conditions potentially limit long-term cap integrity.

Based upon the fatal flaws identified, the core team develops a technical memorandum specifying the additional information to be collected as part of a limited field investigation. Additional information is collected from four bore holes, three of which indicate elevated concentrations of volatile organics above 50 ppb. Therefore, the core team's initial preference for excavation and off-site solidification / stabilization and disposal is discarded. Concurrently, the core team initiates a bench scale study which confirms that leaching criteria will not be met due to higher than anticipated percentages of volatile organics in the soil. In-situ treatment is thereby screened out as a potential response.

Existing information (i.e., the Department's "Facility Use Plan" and the "Citizen's Recommendation for Future Land Use" prepared by stakeholders the previous year) indicate no concerns exist for intrusion or long-term maintenance. Furthermore, available geologic data suggest the contaminated area is suitably stable for construction of a cap. Therefore, the core team concludes that capping in place is the preferred response, but that a soil vapor extraction system should be constructed beneath the cap to address the long-term concerns posed by volatiles.

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[3] See related fact sheet, *Expediting Cleanup through Uncertainty Management*.