



# ENVIRONMENTAL RESTORATION

*U.S. Army Environmental Center*

## INDEPENDENT TECHNICAL REVIEW/

### GROUNDWATER EXTRACTION AND TREATMENT EFFECTIVENESS REVIEW

#### Independent Technical Review

Two years ago, the Office of the Assistant Chief of Staff for Installation Management (OACSIM) initiated the Independent Technical Review (ITR) program; first for the Base Realignment and Closure Program in Fiscal Year 1998 (FY98), and then for the Active Sites Cleanup Program in FY99.

ITR is a third-party, project-level technical review that provides recommendations concerning investigations and cleanup plans. Its objective is to ensure the implementation of cost-effective investigations and remedies, while meeting the Army's obligation to protect human health and the environment.

ITR provides access to top environmental experts from a variety of environmental disciplines. The ITR panel reviews specific projects to determine whether the investigative approach, proposed actions, proposed monitoring plans, and exit strategies are technically sound. The panel develops recommendations to be considered by the Army decision-makers in determining the appropriate course of action. The panel's recommendations are intended to improve decision-making and to support technically sound initiatives. In addition to making recommendations, subject matter experts provide follow-up technical assistance to address specific issues identified during the reviews.


#### ITR Lessons Learned

A common problem noted in all of the ITR reports is the need to improve the decision-making process.

Clear problem definition is the first step toward making sound decisions. Prior to designing data collection efforts, it is critical to understand what problem or potential problem is to be addressed (i.e., what receptors are potentially at risk from what contaminants through what exposure pathways?). Through development of conceptual site models, those linkages can be illustrated, and data needs to verify those linkages can be identified. By clearly defining the problem, decision criteria can be established and data collection can be limited to those data required to make decisions regarding appropriate response actions for each potential source-pathway-receptor link.

Concurrent with problem definition, preliminary assessment of likely response actions should be conducted. Early identification of possible response actions can be used to guide investigations to ensure that necessary data are collected to support remedy selection and design. Conceptual site models can be used at this point to identify fatal flaws in potential responses. (For example, if the potential source is buried liquid-filled drums in a landfill and the pathway is groundwater, capping would not address the likely release mechanism of liquid leaking and flowing downward to the aquifer. Likewise, if wastes are buried below the water table, capping would not be effective.)





A third, critical part of effective decision-making involves the management of uncertainty. Uncertainty will always exist in restoration decisions, and attempting to eliminate it is futile and costly. Management of uncertainty will always be required. Uncertainty is managed through the development of decision criteria and sampling programs built upon those criteria (e.g., use of upper confidence levels of mean concentrations needed to feed risk assessments dictate the sampling design). It is also managed through the selection and design of response actions. Responses can be designed to mitigate uncertainties through the use of contingencies or through use of robust designs that address the full range of possible conditions that may affect performance of the remedy.

The general applicability of the recommendation to improve decision-making led to the development of the Principles of Environmental Restoration (PER) Workshop, which stresses the importance of decision-based planning. The PER Workshop provides a facilitated training session, for the project team, on effective application of the four key principles of environmental restoration: (1) building an effective project management team; (2) clear, concise, and accurate problem identification; (3) early identification of possible response actions; and (4) management of the inherent uncertainties.

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## Groundwater Extraction and Treatment Effectiveness Review (GWETER)

The Army initiated the Groundwater Extraction and Treatment Effectiveness Review (GWETER) program in FY99 to assess the effectiveness of existing groundwater treatment systems. GWETER teams provide recommendations on system optimization and on applicability of more cost-effective alternatives. For example, protocols for determining the effectiveness of natural attenuation have matured, and natural attenuation is now more widely accepted as an alternative to pump-and-treat systems. GWETER investigates all aspects of the groundwater exposure pathway to recommend the most cost-effective solution to groundwater contamination. GWETER also examines proposed pump-and-treat systems to ensure all alternatives are considered.

GWETER encourages installations to consult regulatory and technical experts, both in-house and outside the government. The effectiveness team includes individuals experienced in the design, operation, and optimization of pump-and-treat systems, as well as in regulatory aspects and community relations.

GWETER has proposed several key recommendations, including creating an overall groundwater strategy for the U.S. Army's cleanup program. Among its points, the strategy includes assigning highest priority to source control, focusing on risk reduction, optimizing existing systems, using natural attenuation in combination with pump-and-treat systems, and defining goals and exit strategies.

# More Information

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