

This e-mail is supported by NAVFAC's Alternative Restoration Technology Team (ARTT) to provide links to Technology Transfer (T2) tools and the latest information on policies, guidance, and training related to innovative technologies. The T2 topics highlighted in this issue will help support the ARTT's chartered goals of promoting the use of innovative technologies, removing barriers to implementing new technologies, and reducing cleanup costs, while remaining protective of the environment and human health.

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This is a special edition of the T2 e-mail to share technical resources to help Navy Remedial Project Managers streamline site management and develop optimized remedial strategies for their sites.

## Groundwater Remediation Resources

In situ bioremediation and in situ chemical oxidation (ISCO) are the most widely used technologies at Navy groundwater sites based upon both a review of Feasibility Studies and T2 survey results. The ARTT determined that technology transfer resources were needed to help to improve the design and performance of these in situ technologies at Navy sites.

### Enhanced Reductive Dechlorination (ERD) Design Considerations

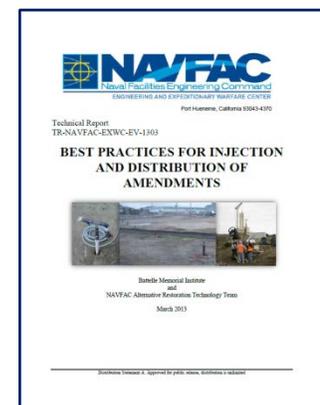
This document provides a framework for ERD design submittals, including a summary of best practices for bioremediation design, sustainable design considerations, tips for appropriate quality assurance and quality control (QA/QC) measures, and a listing of useful standards and references. Lessons learned from Navy sites are shared related to the design, implementation, and performance of ERD systems.

### In Situ Chemical Oxidation Design Considerations

This document provides a framework for in situ chemical oxidation (ISCO) design submittals. Best practices for ISCO design are outlined including sustainable design and operational approaches, appropriate QA/QC measures, and useful standards and references. Lessons learned and performance issues at ISCO sites are also addressed.

### Best Practices for Injection and Distribution of Amendments

This document presents "best practices" for introducing liquid- and solid-phase amendments into aquifers. Improved injection approaches will increase the likelihood that amendments are adequately distributed and enhance remedy performance.



## Complex Site Management Resources

Three handbooks were developed by the ARTT to serve as a foundation for managing complex sites and challenging sites with non-aqueous phase liquids (NAPLs).

### Groundwater Risk Management Handbook

This handbook provides an overview of challenging site conditions for groundwater plumes and summarizes risk management strategies such as establishing points of compliance, alternate concentration limits, performing mixing zone analyses, and Technical Impracticability waivers.

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For questions or more information, please contact [EXWC\\_T2@navy.mil](mailto:EXWC_T2@navy.mil) or visit our Web page at: <https://www.navfac.navy.mil/go/erb>

## [DNAPL Management Overview Handbook](#)

This handbook provides an introduction on how to manage dense non-aqueous phase liquid (DNAPL) contamination at a site, focusing on the limitations of characterizing and removing DNAPL and how to make realistic management decisions.

## [LNAPL Site Management Handbook](#)

This handbook provides an overview of effective strategies for managing light non-aqueous phase liquid (LNAPL) contaminated sites. It covers LNAPL conceptual site models, natural source zone depletion evaluations, performance metrics, and risk management strategies to achieve closure.

## Additional Technology Resources

### [NAVFAC ERB Web Site Technology Profiles \(Alphabetical Order\)](#)

#### [NAVFAC T2 Web Site](#)

Visit the T2 Web site for additional resources such as Web tools, videos, factsheets, white papers, handbooks, cost and performance (C&P) reports, and other technical resources. Examples include:

- [In Situ Biogeochemical Transformation Factsheet](#)
- [T2 Web Tools](#) on Permeable Mulch Biowalls, Phytoremediation, Monitored Natural Attenuation, Zero Valent Iron (ZVI), and more
- [C&P Report for Permeable Reactive Barriers](#)
- [C&P Report for Persulfate](#)

#### [NAVFAC Optimization Web Page](#)

The goal of optimization is to maximize the effectiveness of the remedial actions used to clean up a contaminated site, while minimizing the cost to achieve site closeout without sacrificing data quality and the ability to make environmentally protective decisions. Optimization resources include:

- [Guidance for Optimizing Remedy Evaluation, Selection and Design](#)
- [Guidance for Optimizing Remedial Action Operation](#)
- [Guidance for Planning and Optimizing Monitoring Strategies](#)
- [Remedial Action Completion in the Navy's Site Closeout Process](#)

#### [U.S. EPA Clu-In Combined Remedies Page \(with Navy Case Studies\)](#)

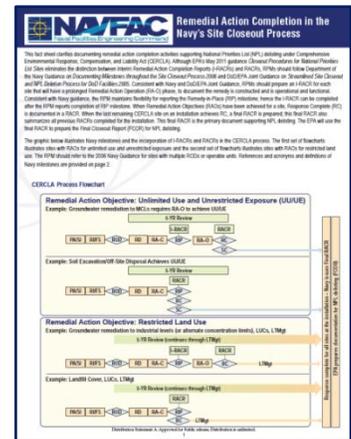
This Web page provides examples of the use of multiple technologies (combined or in treatment trains) to address contamination resulting from subsurface releases. The Navy's optimization guidance is cited and the Navy is recognized as a leader in promoting combined remedies at five case study sites.

## SERDP/ESTCP Webinar Series

The series continues in May 2015 with two webinars on managing munitions impacts in both marine and subsurface environments. On May 7, Dr. Carl Friedrichs (Virginia Institute of Marine Science) and Dr. Joseph Calantoni (Naval Research Laboratory) will discuss factors affecting munitions mobility underwater and in situ measurements. On May 28, Dr. Thomas Jenkins (Private Consultant) and Dr. Paul Hatzinger (CB&I Federal Services) will discuss new tools for characterizing and remediating munitions and energetics at military ranges. Both webinars target end users including practitioners, the regulatory community and researchers with the objective of providing cutting-edge and practical information from sponsored research and technology demonstrations in an easily accessible format.

For more information and to register, please visit the SERDP and ESTCP Web site:

<https://www.serdp-estcp.org/Tools-and-Training/Webinar-Series>



For questions or more information, please contact [EXWC\\_T2@navy.mil](mailto:EXWC_T2@navy.mil) or visit our Web page at: <https://www.navfac.navy.mil/go/erb>