



*Course manual for
Groundwater High-Resolution
Site Characterization*

COURSE OUTLINE

Groundwater High-Resolution Site Characterization

- I. Introduction and Background
- II. Impacts of Subsurface Heterogeneity
- III. Scale-Appropriate Measurement and Data Density
- IV. Potentially Applicable Tools
- V. Data Use, Management, and Visualization
- VI. HRSC Case Studies
- VII. Wrap Up

Course Description and Objectives

The Groundwater High-Resolution Site Characterization (HRSC) training course focuses on groundwater characterization and discusses (1) the impacts of subsurface heterogeneity on the investigation and cleanup of groundwater and related media, (2) the need for scale-appropriate measurements and adequate data density, and (3) the tools and strategies that are available to overcome the impacts of subsurface heterogeneity. The course addresses the following technical content:

- Defining and explaining the need for and benefits of HRSC
- Understanding the sources and attributes of subsurface heterogeneity and their impact on hydrogeology, contaminant fate and transport, and source and plume relationships
- Defining and using scale-appropriate measurements, adequate data density and collaborative data sets
- Explaining the application of HRSC to the characterization of integrated media, including: groundwater, soil, soil vapor, surface water, sediments and bedrock
- Evaluating potentially applicable tools for subsurface investigations of shallow unconsolidated environments, deep unconsolidated environments, fractured and porous media, and the groundwater and surface water interface
- Developing effective HRSC implementation and investigation strategies
- Managing and visualizing HRSC data for decision making
- Applying HRSC to remedy design, implementation and optimization

After taking this course, participants will be armed with information that will allow them to improve their subsurface investigation approaches and develop more realistic and comprehensive conceptual site models (CSM). CSMs developed based on HRSC strategies and tools will decrease site uncertainty, improve the remedy selection process for groundwater remedies, and better enable the evaluation, design, and implementation of targeted *in situ* and *ex situ* groundwater remedies.

Target Audience and Registration Information

The *Groundwater HRSC* course is an advanced 2-day course. The recommended audience includes EPA, federal, state, tribal and private industry technical project managers, practitioners and other stakeholders involved in groundwater investigation and remediation.

Visit www.trainex.org and select the CERCLA Education Center to view the current schedule of offerings and register to attend. There are no tuition costs for this training. Participants will receive reference material, including a detailed manual, to continue their education after the course ends.

Other CERCLA Education Center Courses

- **Remedial Process:** Provides a comprehensive examination of the technical and regulatory issues that must be addressed during remedial response efforts at Superfund sites. This training is designed primarily for RPMs and other environmental professionals in the Superfund program who are responsible for or need to know about remedial activities under CERCLA.
- **Remedial Design/Remedial Action (RD/RA) Training Program for RPMs:** Provides steps for implementing and completing an RD/RA under Superfund and describes the overall effort needed to conduct an RD/RA project. The training program is designed primarily for RPMs who currently or soon will be involved in an RD/RA project.
- **RPM 201:** Provides an interactive approach to prepare RPMs for the challenges they will face as they prepare for a remedial action. The course provides instruction on how to manage common issues or concepts at remedial action sites such as vapor intrusion, sediment removal, contaminated groundwater plumes and green remediation.

Online Resources

TRAINEX

The Training Exchange website provides a wide range of training information for staff involved in hazardous waste management and remediation. The site provides up-to-date course information and training schedules for classroom and internet-based courses.
www.trainex.org



OTHER SOURCES FOR INFORMATION

HAZARDOUS WASTE CLEAN-UP INFORMATION (CLU-IN)

www.clu-in.org

NATIONAL ASSOCIATION OF REMEDIAL PROJECT MANAGERS (NARPM) ANNUAL TRAINING PROGRAM

www.epanarpm.org

TRIAD RESOURCE CENTER

www.triadcentral.org

GREEN REMEDIATION

www.clu-in.org/greenremediation

BROWNFIELDS AND LAND REVITALIZATION TECHNOLOGY SUPPORT CENTER (BTSC)

www.brownfieldstsc.org

ENVIRONMENTAL RESPONSE TRAINING PROGRAM (ERTP)

www.trainex.org and select the ERTP

INTERSTATE TECHNOLOGY & REGULATORY COUNCIL

www.itrcweb.org

FEDERAL REMEDIATION TECHNOLOGIES ROUNDTABLE

www.frtr.gov

TECHNOLOGY INNOVATION PROGRAM HOME PAGE ON EPA'S WEBSITE

www.epa.gov/superfund/remedytech

TECHNICAL SUPPORT PROJECT

www.epa.gov/superfund/remedytech/partner.htm

ABOUT THE CERCLA EDUCATION CENTER

The CERCLA Education Center (CEC) is a unique training forum implemented by EPA's Office of Solid Waste and Emergency Response. CEC courses have been developed cooperatively by the Office of Superfund Remediation and Technology Innovation; the Office of Emergency Management; the Office of Acquisition Management; the Office of Enforcement and Compliance Assurance; and the Office of Research and Development. Site managers from EPA regions provide technical advice, comment and support. The CEC's structured curriculum, designed primarily for EPA hazardous waste site managers and responders, enables participants to attend training that is of particular interest to them and most appropriate for their projects and workloads.

UP-TO-DATE COURSE INFORMATION

For information about course schedules, visit EPA's Training Exchange at www.trainex.org.

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