



TechDirect, April 1, 2018

Welcome to TechDirect! Since the March 1 message, TechDirect gained 70 new subscribers for a total of 39,527. If you feel the service is valuable, please share TechDirect with your colleagues. Anyone interested in subscribing may do so on CLU-IN at <https://clu-in.org/techdirect>. All previous issues of TechDirect are archived there. The TechDirect messages of the past can be searched by keyword or can be viewed as individual issues.



TechDirect's purpose is to identify new technical, policy and guidance resources related to the assessment and remediation of contaminated soil, sediments and groundwater.

Mention of non-EPA documents or presentations does not constitute a U.S. EPA endorsement of their contents, only an acknowledgment that they exist and may be relevant to the TechDirect audience.

> Upcoming Live Internet Seminars

Environmental Sequence Stratigraphy and the new EPA Remediation Geology Paradigm - April 3, 2018, 12:00PM-1:30PM EDT (16:00-17:30 GMT). This webinar will highlight a recently released EPA Technical Issue Paper serving as a practical guide on the application of the geologic principles of sequence stratigraphy and facies models to the characterization of stratigraphic heterogeneity at hazardous waste sites. This technology is applicable to sites underlain by clastic aquifers (intermixed gravels/sands/silts/clays). The scientific principles and methods presented in this document will help to bring clarity to the challenges posed by stratigraphic heterogeneity at complex contaminated sites thereby facilitating site management strategies. These methods can be applied to both new site investigations as well as reviewing existing site data and updating the Conceptual Site Model (CSM). High resolution site characterization (HRSC) is EPA's preferred approach for characterizing sites and developing a detailed CSM. The application of Environmental Sequence Stratigraphy (ESS) allows the practitioner to place high resolution data and other environmental subsurface data in a geologic and hydrogeologic context. This advanced geologic approach evaluates subsurface site information in the context of the site's geologic depositional and erosional history. Application of ESS benefits groundwater remediation projects by improving the ability to: define groundwater flow paths and preferential contaminant migration pathways, map and predict contaminant mass transport and storage zones, identify data gaps to conduct high resolution site characterization, determine appropriate locations for monitoring and remediation wells, determine appropriate well construction design (e.g., screened intervals), improve efficiency of remediating and monitoring contaminated groundwater, and focus your site strategy to save significant time and money. For more information and to register, see <https://clu-in.org/live>.

ITRC Petroleum Vapor Intrusion: Fundamentals of Screening, Investigation, and Management - April 5, 2018, 1:00PM-3:15PM EDT (17:00-19:15 GMT). Chemical

contaminants in soil and groundwater can volatilize into soil gas and migrate through unsaturated soils of the vadose zone. Vapor intrusion (VI) occurs when these vapors migrate upward into overlying buildings through cracks and gaps in the building floors, foundations, and utility conduits, and contaminate indoor air. If present at sufficiently high concentrations, these vapors may present a threat to the health and safety of building occupants. Petroleum vapor intrusion (PVI) is a subset of VI and is the process by which volatile petroleum hydrocarbons (PHCs) released as vapors from light nonaqueous phase liquids (LNAPL), petroleum-contaminated soils, or petroleum-contaminated groundwater migrate through the vadose zone and into overlying buildings. The ITRC Technical and Regulatory Guidance Web-Based Document, Petroleum Vapor Intrusion: Fundamentals of Screening, Investigation, and Management (PVI-1, 2014) and this associated Internet-based training provides regulators and practitioners with consensus information based on empirical data and recent research to support PVI decision making under different regulatory frameworks. The PVI assessment strategy described in this guidance document enables confident decision making that protects human health for various types of petroleum sites and multiple PHC compounds. This guidance provides a comprehensive methodology for screening, investigating, and managing potential PVI sites and is intended to promote the efficient use of resources and increase confidence in decision making when evaluating the potential for vapor intrusion at petroleum-contaminated sites. By using the ITRC guidance document, the vapor intrusion pathway can be eliminated from further investigation at many sites where soil or groundwater is contaminated with petroleum hydrocarbons or where LNAPL is present. For more information and to register, see <https://www.itrcweb.org> or <https://clu-in.org/live>.

ITRC Long-term Contaminant Management Using Institutional Controls - April 10, 2018, 1:00PM-3:15PM EDT (17:00-19:15 GMT).

Institutional controls (ICs) are administrative or legal restrictions that provide protection from exposure to contaminants on a site. When ICs are jeopardized or fail, direct exposure to human health and the environment can occur. While a variety of guidance and research to date has focused on the implementation of ICs, ITRC's Long-term Contaminant Management Using Institutional Controls (IC-1, 2016) guidance and this associated training class focuses on post-implementation IC management, including monitoring, evaluation, stakeholder communications, enforcement, and termination. The ITRC guidance and training will assist those who are responsible for the management and stewardship of ICs. After attending the training, participants will be able to: describe best practices and evolving trends for IC management at individual sites and across state agency programs; use this guidance to improve IC reliability and prevent IC failures, improve existing, or develop new, IC Management programs, identify the pros and cons about differing IC management approaches; use the tools to establish an LTS plan for specific sites; and use the elements in the tools to understand the information that should populate an IC registry or data management system. For more information and to register, see <http://www.itrcweb.org> or <http://clu-in.org/live>.

NAVFAC Open Environmental Restoration Resource (OER2) Webinar: Munitions Response Program Update and Lessons Learned - April 25, 2018, 2:00 PM ET (18:00 GMT).

This topic will present updates in the form of case studies and lessons learned from completed and ongoing NAVFAC Munitions Response Program (MRP) projects. The session will include an update on the Defense Advanced Geophysical Classification Accreditation Program (DAGCAP) and discussion of using the vertical conceptual site model (VCSM) on munitions projects.

For more information and to register, see

<https://cc.readytalk.com/registration/#/?meeting=vw2u9d02kl1v&campaign=i3h70wnxcxsh>.

ITRC Remediation Management of Complex Sites - April 26, 2018, 1:00PM-3:15PM EDT (17:00-19:15 GMT).

This training course and associated ITRC guidance: Remediation Management of Complex Sites (RMCS-1, 2017), provide a recommended holistic process for management of challenging sites, termed "adaptive site management."

By participating in this training course we expect you will learn to apply the ITRC guidance document to: identify and integrate technical and nontechnical challenges into a holistic approach to remediation; use the Remediation Potential Assessment to identify whether adaptive site management is warranted due to site complexity; understand and apply adaptive site management principles; develop a long-term performance-based action plan; apply well-demonstrated techniques for effective stakeholder engagement; access additional resources, tools, and case studies most relevant for complex sites; and communicate the value of the guidance to regulators, practitioners, community members, and others. For more information and to register, see <https://www.itrcweb.org> or <https://clu-in.org/live>.

Mining Webinar Series: Successful Implementation of Biologically-Based Passive Remediation Systems -Tuesday, May 1, 2018; 2:00-3:30 PM EST (18:00-19:00 GMT).

Metal mines at their end of active operations must prepare for the potential long-term treatment of mining-influenced water (MIW). This webinar will highlight how biologically-based passive remediation technologies have been shown to be a cost-effective option for treating MIW, especially mildly- to moderately-impacted waters at low- to moderate-flow rates such as may be found at remote or closed mine sites. Presenters will share an overview of biologically-based passive remediation technologies, their applicability to mining site conditions and illustrate the remedial design and evaluation process with a current treatability study example. In addition, two case study examples of mining sites with operating biologically-based passive treatment systems will be presented: Iron King Mine near Jerome, Arizona, and Garfield Mine near Delta, Colorado. For more information and to register, see <https://clu-in.org/live>.

ITRC Bioavailability of Contaminants in Soil: Considerations for Human Health Risk Assessment - May 3, 2018, 1:00PM-3:15PM EDT (17:00-19:15 GMT).

The basis for this training course is the ITRC guidance: Bioavailability of Contaminants in Soil: Considerations for Human Health Risk Assessment (BCS-1). This guidance describes the general concepts of the bioavailability of contaminants in soil, reviews the state of the science, and discusses how to incorporate bioavailability into the human health risk assessment process. The target audience for this guidance and training course are: project managers interested in decreasing uncertainty in the risk assessment which may lead to reduced remedial action costs, and risk assessors new to bioavailability or those who want additional confidence and training in the current methods and common practices for using bioavailability assessment to more accurately determine human health risk at a contaminated site. As a participant in this training you should learn to: apply the decision process to determine when a site-specific bioavailability assessment may be appropriate, use the ITRC Review Checklist to develop or review a risk assessment that includes soil bioavailability, consider factors that affect arsenic, lead and PAH bioavailability, select appropriate methods to evaluate soil bioavailability, and use tools to develop site-specific soil bioavailability estimates and incorporate them into human health risk assessment. For more information and to register, see <https://www.itrcweb.org> or <https://clu-in.org/live>.

Combined Remedies: The New Normal - Attentive Use of the "Right" Tools - May 21, 2018, 1:00PM-2:00PM EDT (17:00-18:00 GMT).

Combining remedies is becoming increasingly prevalent across the spectrum of hazardous waste sites from relatively simple to more complex. This trend is driven by 1) a larger remedial tool box; and 2) by increased understanding that contamination occurs in different phases and concentrations, and in different subsurface compartments. Combining remedies is only part of the story. Flexible, attentive, adaptive deployment is equally important as surprises are not uncommon and conditions change during remedy implementation. This webinar will discuss the underlying principles of attentive deployment of a variety of remedial technologies along with informative case studies - with particular emphasis on NPL sites. For more information and to register, see <https://clu-in.org/live>.

Highlight from the CLU-IN Seminar Archives. Each edition of TechDirect highlights a previously recorded internet seminar from our archives that may be of interest to our readers. We welcome your feedback on this addition to TechDirect.

Analytical Tools and Methods: Session I - Field-ready Biosensors to Assess Bioavailability and Toxicity, Sponsored by: NIEHS Superfund Research Program, Archived: Monday, April 17, 2017 (2 hours). This webinar series highlighted innovative analytical tools and methods developed and used by Superfund Research Program (SRP) grantees. The presenters featured the benefits of these new tools and methods compared to conventional methods. They also included information about how the technology has helped to facilitate ongoing SRP research. In the first session, researchers described their tools to assess bioavailability/toxicity for more effective human and/or environmental monitoring. Treatment assessments and water quality monitoring that rely only on measuring the reduction of target contaminant concentrations are often insufficient because they do not consider the complex and broader risks that specific contaminants or mixtures and their transformation products pose to the environment and human health. For more information or to replay Session 1, visit https://clu-in.org/conf/tio/SRPAAnalyticalT&M1_041717/.

> New Documents and Web Resources

ITRC Releases Three PFAS Fact Sheets. ITRC has released three new PFAS fact sheets:

- Environmental Fate and Transport
- Site Characterization Considerations, Sampling Precautions, and Laboratory Analytical Methods
- Remediation Technologies and Methods

ITRC has developed this series of fact sheets to summarize the latest science and emerging technologies for per- and polyfluoroalkyl substances (PFAS). The fact sheets are tailored to the needs of state regulatory program personnel who are tasked with making informed and timely decisions regarding PFAS-impacted sites. The content is also useful to consultants and parties responsible for the release of these contaminants, as well as community stakeholders. View or download at <https://pfas-1.itrcweb.org/fact-sheets/>.

Superfund Research Program Science Digest - Technology Profile, March 2018. As part of an SRP small business project, researchers are developing a technology to expedite removal of per- and polyfluoroalkyl substances (PFAS) from soil and groundwater. Read more at https://www.niehs.nih.gov/research/supported/centers/srp/science_digest/2018/3/technology/technology_profile.cfm

Technology Innovation News Survey Corner. The Technology Innovation News Survey contains market/commercialization information; reports on demonstrations, feasibility studies and research; and other news relevant to the hazardous waste community interested in technology development. Recent issues, complete archives, and subscription information is available at <https://clu-in.org/products/tins/>. The following resources were included in recent issues:

- Groundwater Source Zone EISB Construction Completion Report, Casper PCE Plumes Orphan Site, Casper, Wyoming
- Estimating the High-Arsenic Domestic-Well Population in the Conterminous United States
- Dioxin Degradation and Metal Biovolatilization at a Former Wood Treating Site
- NMR-Based Sensors for In Situ Monitoring of Changes in Groundwater Chemistry

- Integration of Filtration and Advanced Oxidation: Development of a Membrane Liquid-Phase Plasma Reactor
- Removal Action Completion Report: Electrical Resistance Heating in Source Area, Former Mercury Cleaners Site Area, 1419 16th Street, Sacramento, California
- Post-Remediation Evaluation of EVO Treatment: How Can We Improve Performance?
- Pilot Studies Report: Former Schilling Air Force Base, Salina, Kansas
- Pilot Study Implementation Report: Lower Columbia Slough-Pacific Meats Cleanup Site, Portland, Oregon
- Rapid Assessment of Remedial Effectiveness and Rebound in Fractured Bedrock
- Ecosystem Services at Superfund Sites: Reuse and the Benefit to Community
- Validation of Passive Sampling Devices for Monitoring of Munitions Constituents in Underwater Environments: Technology User's Manual

EUGRIS Corner. New Documents on EUGRIS, the platform for European contaminated soil and water information. More than 16 resources, events, projects and news items were added to EUGRIS in March 2018. These can be viewed at <http://www.eugris.info/whatsnew.asp> . Then select the appropriate month and year for the updates in which you are interested. The following resource was posted on EUGRIS:

Removal Action Completion Report Electrical Resistance Heating in Source Area Former Mercury Cleaners Site Area (2018). Mercury Cleaners operated as a dry cleaner from 1947 to 2014. The facility used a variety of dry cleaning solvents, and the site requires soil and groundwater treatment to remediate the impacts of petroleum-based Stoddard Solvent and of PCE and its daughter products. Cleanup began in 2015 with a soil vapor extraction (SVE) system pilot test, which is currently operating. To address soil contaminated with PCE above residential screening levels in an area ~40 ft by 40 ft in plan, a source area removal action was implemented in November 2016 using in situ electrical resistance heating (ERH) thermal desorption. Comprising 15 electrode/vapor recovery wells located within the source area, the ERH system was designed to volatilize VOCs in the subsurface for SVE system removal and treatment. The goal of the removal action was to reduce contaminant mass by > 99% and lower concentrations of TPH, PCE, and other VOCs below the soil and groundwater cleanup goals. ERH system operation ended on July 7, 2017. Although source area cleanup goals were not met completely, significant PCE mass was removed from the source area. View or download at http://geotracker.waterboards.ca.gov/esi/uploads/geo_report/5028631806/T10000003411.PDF.

> Conferences and Symposia

EPA to present at 11th Symposium on Design and Construction Issues at Hazardous Waste Sites, Philadelphia, PA, April 18-20, 2018. EPA staff will present at the Symposium on a range of topics including Approaches to Managing Large Superfund Sites, Site Investigation and Characterization: Applications in Design and Remedial Action and Employing Adaptive Techniques to Expedite Site Completion. For more information, see <https://www.same.org/Get-Connected/Find-a-Post/Philadelphia/Meetings-Events/ModuleID/1671/ItemID/1730/mct/EventDetails>.

Groundwater High-Resolution Site Characterization (HRSC), Tallahassee, FL, May 1-2, 2018. This 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. 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. 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. For more information and to register, see <https://trainex.org/hrsc>.

EPA to Convene National Leadership Summit to Take Action on PFAS, Washington, D.C., May 22-23, 2018. During the summit, participants will work together to share information on ongoing efforts to characterize risks from PFAS and develop monitoring and treatment/cleanup techniques; identify specific near-term actions, beyond those already underway, that are needed to address challenges currently facing states and local communities and develop risk communication strategies that will help communities to address public concerns with PFAS. For more information, see <https://www.epa.gov/pfas/pfas-national-leadership-summit-and-engagement>.

Incremental Sampling, Dallas, TX, July 26-27, 2018. This training course focuses on the theory and application of ITRC's Incremental Sampling Methodology (ISM), composite sampling designs, and hybrids of the two. IS hybrid designs are useful to address multiple project goals simultaneously. Since "representativeness" is a key aspect of data quality and ISM/IS data are demonstrably more representative than most discrete data, it will be argued that IS data are indeed "better" than non-IS data. The course will answer questions such as: what is the difference between ITRC's ISM and EPA's Incremental Sampling (IS) strategies? Is there written EPA guidance? What features should an ISM or IS design have? Can IS give project risk assessors the data they want, while simultaneously meeting the RPM's own data needs for characterization or remedial design? How are background concentrations determined and comparisons to background handled using IS? Do we know whether IS "worked" for the project? For more information and to register, see <https://trainex.org/offeringlist.cfm?courseid=1621>.

Best Practices for Site Characterization Throughout the Remediation Process, Dallas, TX, July 23-26, 2018. This training course is based on best management practices (BMP) implemented by the U.S. EPA, partnership organizations, federal and state partners, and consultants. Participants will learn how to streamline projects in a legal, technically sound, and cost-effective manner. By taking the course, participants achieve the following objectives: integrate best practices into traditional project activities, effectively collect and communicate critical project information, design dynamic work strategies, recognize and overcome the challenges presented while implementing a dynamic work strategy, and use BMPs to support all phases of the environmental cleanup life cycle. For more information and to register, see <https://trainex.org/offeringlist.cfm?courseid=1515>.

NOTE: For TechDirect, we prefer to concentrate mainly on new documents and the Internet live events. However, we do support an area on CLU-IN where announcement of conferences and courses can be regularly posted. We invite sponsors to input information on their events at <https://clu-in.org/courses>. Likewise, readers may visit this area for news of upcoming events that might be of interest. It allows users to search events by location, topic, time period, etc.

If you have any questions regarding TechDirect, contact Jean Balent at (703) 603-9924 or balent.jean@epa.gov. To unsubscribe, send a blank email to [\\$subst\('Email.UnSub'\)](mailto:$subst('Email.UnSub')). Remember, you may subscribe, unsubscribe or change your subscription address at <https://clu-in.org/techdirect> at any time night or day.

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