



TechDirect, April 1, 2019

Welcome to TechDirect! Since the March 1 message, TechDirect gained 81 new subscribers for a total of 38,988. 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.



This email has been resent to correct an error in the earlier delivery of the April 1st Edition. We apologize for any confusion that the earlier error may have caused. Thanks to those valued subscribers who reported the error.



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

Military Munitions Support Services - Risk Management Method for MMRP - April 3, 2019, 1:00PM-3:00PM EDT (17:00-19:00 GMT). This session is focused to present findings from trial use of the USACE Risk Management Method for MMRP sites, with results from multiple case studies and programs. Session will summarize positives, as well as challenges and identify areas for improvement. For more information and to register, see <http://clu-in.org/live>.

ITRC Integrated DNAPL Site Characterization - April 4, 2019, 1:00PM-3:15PM EDT (17:00-19:15 GMT). The Integrated DNAPL Site Characterization Team has synthesized the knowledge about dense nonaqueous phase liquid (DNAPL) site characterization and remediation acquired over the past several decades, and has integrated that information into a new document, Integrated DNAPL Site Characterization and Tools Selection (ISC-1, 2015). This guidance is a resource to inform regulators, responsible parties, other problem holders, consultants, community stakeholders, and other interested parties of the critical concepts related to characterization approaches and tools for collecting subsurface data at DNAPL sites. After this associated training, participants will be able to use the guidance to develop and support an integrated approach to DNAPL site characterization, including: identify what site conditions must be considered when developing an informative DNAPL conceptual site model (CSM); define an objectives-based DNAPL characterization strategy; understand what tools and resources are available to improve the identification, collection, and evaluation of appropriate site characterization data; and navigate the DNAPL characterization tools table and select appropriate technologies to

fill site-specific data gaps. For more information and to register, see <https://www.itrcweb.org> or <https://clu-in.org/live>.

ITRC Characterization and Remediation of Fractured Rock - April 9, 2019, 1:00PM-3:15PM EDT (17:00-19:15 GMT). The basis for this training course is the ITRC guidance: Characterization and Remediation of Fractured Rock. The purpose of this guidance is to dispel the belief that fractured rock sites are too complex to characterize and remediate. The physical, chemical and contaminant transport concepts in fractured rock have similarities to unconsolidated porous media, yet there are important differences. By participating in this training class, you should learn to use ITRC's Fractured Rock Document to guide your decision making so you can: develop quality Conceptual Site Models (CSMs) for fractured rock sites, set realistic remedial objectives, select the best remedial options, monitor remedial progress and assess results, and value an interdisciplinary site team approach to bring collective expertise to improve decision making and to have confidence when going beyond containment and monitoring -- to actually remediating fractured rock sites. For more information and to register, see <https://www.itrcweb.org> or <https://clu-in.org/live>.

ITRC Petroleum Vapor Intrusion: Fundamentals of Screening, Investigation, and Management - April 11, 2019, 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 provide 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>.

Biogeochemical Interactions Affecting Bioavailability for in Situ Remediation - Progress in Research, Superfund Research Program - April 22, May 13 and 20, 2019. This webinar series will feature individual research projects funded by the NIEHS Superfund Research Program (SRP). In 2013, the SRP initiated a targeted research program to better understand how contaminants in the environment are affected by complex biological, geological, and chemical processes. By understanding these complex interactions, we are better equipped to optimize remediation strategies and, therefore, improve science-based decision making for site management, priority-setting, and remedy selection. The individual research project grants support problem-solving research on the mechanisms of biogeochemical interactions that may impact remediation of contaminated soil, sediment, surface water, or groundwater. For more information and to register, see <https://clu-in.org/live>.

Long-Term Performance of Biochemical Reactors for Passive Treatment of Mine-Impacted Water - April 23, 2019, 2:00PM-3:30PM EDT (18:00-19:30 GMT).

This webinar will present an overview on the background, history and principles on the use of biochemical reactors (BCRs) to treat mine-impacted water. This will include a detailed review of the configuration, operation and performance of a typical BCR system and will provide data and observations from two long-term (>8 years) operating BCR systems as examples. This presentation will also touch on the benefits and limitations, capital and operation-maintenance costs, applicability to other contaminants, as well as regulatory challenges of passive treatment using biochemical reactors through an overview of similar and related passive or semi-passive biochemical reactors currently in operation. For more information and to register, see <https://clu-in.org/live>.

ITRC Geospatial Analysis for Optimization at Environmental Sites - April 25, 2019, 1:00PM-3:15PM EDT (17:00-19:15 GMT). The purpose of ITRC's Geospatial Analysis for Optimization at Environmental Sites (GRO-1) guidance document and this associated training is to explain, educate, and train state regulators and other practitioners in understanding and using geospatial analyses to evaluate optimization opportunities at environmental sites. With the ITRC GRO-1 web-based guidance document and this associated training class, project managers will be able to: evaluate available data and site needs to determine if geospatial analyses are appropriate for a given site; for a project and specific life-cycle stage, identify optimization questions where geospatial methods can contribute to better decision making; for a project and optimization question(s), select appropriate geospatial method(s) and software using the geospatial analysis work flow, tables and flow charts in the guidance document; with geospatial analyses results (note: some geospatial analyses may be performed by the project manager, but many geospatial analyses will be performed by technical experts), explain what the results mean and appropriately apply in decision making; and use the project manager's tool box, interactive flow charts for choosing geospatial methods and review checklist to use geospatial analyses confidently in decision making. For more information and to register, see <http://www.itrcweb.org> or <https://clu-in.org/live>.

ITRC Connecting the Science to Managing LNAPL Sites a 3 Part Series - May 2, 9, and 16, 2019. The newly updated LNAPLs (Light Non-Aqueous Phase Liquids) 3-part training course series is based on the ITRC guidance: LNAPL Site Management: LCSM Evolution, Decision Process, and Remedial Technologies (LNAPL-3, 2018) and focuses on connecting the science to managing LNAPL sites and helping you: build upon your understanding of LNAPL behavior in the subsurface (Part 1), develop your LNAPL conceptual site model and LNAPL remedial goals (Part 2), and select/implement LNAPL technologies (Part 3). After this training series, the expectation is that you will have the skills and understanding to use ITRC science-based resources to improve decision making at your LNAPL sites. For regulators and other government agency staff, this improved understanding can hopefully be incorporated into your own LNAPL programs. It is expected that participants will attend this 3-part training series in sequence. For more information and to register, see <https://www.itrcweb.org> or <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

High Resolution Site Characterization (HRSC): Pragmatic Approaches to Remediation Success, Sponsor: US EPA, Office of Land and Emergency Management (OLEM), Office of Underground Storage Tanks (OUST) Archived Feb 20, 2018 Seminar (2 Hours, 30 Minutes). Successful remediation decisions at contaminated sites depend on the quality of the collected data, accuracy of data analysis, and interpretation of that data during site assessment and characterization.

This webinar presented various case studies, which demonstrate how to apply HRSC strategies using direct sensing tools advanced using direct push technologies (DPT) and interpretive techniques to support and improve remediation decisions at sites.

Examples of direct sensing tools include: hydraulic profiling tools (HPT), membrane interface probe (MIP), flame ionization detector (FID), photoionization detector (PID), and electrical conductivity. High resolution site characterization strategies and techniques involve a flexible, scalable, and phased approach to site characterization and remediation, and they reduce uncertainty by identifying site characteristics. The HRSC systematic approach results in a detailed conceptual site model that is continuously refined over the life of the project and can be used to make successful remediation decisions, which result in faster and more effective site cleanups. To replay the archived webinar, visit https://clu-in.org/conf/tio/HRSC_022018/.

> New Documents and Web Resources

Updated CLU-IN Technology Developer Tools & Resources. The Technology Developer Tools and Resources support area provides tools to help advance technologies through all stages of product development from conception of an idea to bench scale and to full commercialization. The materials cover a broad range of topics that include business planning, marketing, financing, and technical issues and sources. View and use at <https://clu-in.org/development/>.

Superfund Research Program Research Brief 291: Passive Samplers Tackle PCB Flux. Researchers from the University of Iowa Superfund Research Program (SRP) Center have developed a method to measure the movement, or flux, of polychlorinated biphenyls (PCBs) from water to air using passive sampling devices. Measuring the flux of PCBs is important for understanding their movement from the dissolved phase in water to a gaseous phase in the air, but this has been a challenge with traditional approaches. By improving how PCB flux is measured, researchers can better understand and predict water- and airborne exposures to PCBs in communities living near contaminated waterways. For more information, see https://tools.niehs.nih.gov/srp/researchbriefs/view.cfm?Brief_ID=291. To get monthly updates on research advances from the SRP you can subscribe to their Research Brief mailing list at <https://list.nih.gov/cgi-bin/wa.exe?SUBED1=SRP-BRIEF&A=1>.

New Passive Sampling Device for Environmental Monitoring for Organic Chemicals in Water. Damian Shea, Ph.D., has invented a novel, patent-pending concept for fabricating a mixed-phase polymer passive sampling device as part of the University of North Carolina at Chapel Hill SRP Center. The device, known as the Composite Integrative Passive Sampler (CIPS), measures chronic exposure to and bioavailability of chemicals and their metabolites. For more information, see https://www.niehs.nih.gov/research/supported/centers/srp/science_digest/2019/3/technology/technology_profile.cfm

Replay Naval Facilities Engineering Command (NAVFAC) Open Environmental Restoration Resource (OER2) Webinars. Webinar topics have included Munitions Response Program Update and Lessons Learned, Rehabilitation and Maintenance of Pump and Treat Systems, and Advances in Microbial Characterization for MNA & Bioremediation. For more information, see https://www.navfac.navy.mil/navfac_worldwide/specialty_centers/exwc/products_and_services/ev/erb/oer2.html

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:

- Memorandum: Columbia Steel Planned Removal Action: Lowlands Area, ECSI #104
- Technology Guide: Bioremediation
- Scientific Evidence and Recommendations for Managing PFAS Contamination in Michigan
- Long-Term Stewardship of Three Evapotranspirative Covers: 15 Years
- Demonstration of New Tools for Improved Source and Recontamination Potential Assessment
- Alternatives Evaluation Report: Penobscot River Phase III Engineering Study, Penobscot River Estuary, Maine
- Detection, Toxicology, Environmental Fate and Risk Assessment of Nanoparticles in the Aquatic Environment (DeTER)
- Assessment and Management of Stormwater Impacts on Sediment Recontamination: Guidance Document
- Updates: Exposure Factors Handbook
- On the Lookout for Practicable Sustainable Options for Asbestos Waste Treatment: A Technical, Sustainability and Market Assessment

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 2019. 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:

CL:AIRE Technical Bulletin 19: Managing Risks and Liabilities associated with Per- and Polyfluoroalkyl Substances (PFASs) (2019). This technical bulletin provides a summary of per- and polyfluoroalkyl substances (PFASs) and highlights approaches to manage risks and liabilities associated with their impact to the environment. View or download at <https://www.clare.co.uk/component/phocadownload/category/17-technical-bulletins?download=668:tb-19-managing-risks-and-liabilities-associated-with-per-and-polyfluoroalkyl-substances-pfass-2019> .

> Conferences and Symposia

12th Symposium on Design and Construction Issues at Hazardous Waste Sites, Philadelphia, PA, April 8-10, 2019. This event is designed to encourage dialogue and information sharing on design and construction issues relevant to hazardous waste sites in the western United States. The applications of engineering and science associated with cleaning up hazardous waste sites continue to evolve rapidly. The goal of this symposium is to facilitate an interactive engagement between professionals from government and the private sector related to relevant and topical issues affecting our field. For more information and to register, see <https://www.same.org/Get-Connected/Find-a-Post/Philadelphia/DCHWS>

Groundwater High-Resolution Site Characterization (HRSC), Chicago, IL, August 14-15, 2019. 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>.

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\('Email.UnSub'\)](#). 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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