



TechDirect, May 1, 2018

Welcome to TechDirect! Since the April 1 message, TechDirect gained 64 new subscribers for a total of 39,315. 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

Mining Webinar Series: Successful Implementation of Biologically-Based Passive Remediation Systems - May 1, 2018, 2:00PM-3:30PM EDT (18:00-19:30 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>.

ITRC Connecting the Science to Managing LNAPL Sites a 3 Part Series - May 8, 15 and 22, 2018, 1:00PM-3:15PM EDT (17:00-19:15 GMT). 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>.

New Approaches and Alternatives for Toxicity Testing: Sessions I, II, and III - May 14, 23 and 30, 2018, 1:00PM-3:00PM EDT (17:00-19:00 GMT). The NIEHS Superfund Research Program (SRP) is hosting a webinar series highlighting research that may be useful as new approaches and methodologies for evaluating the safety of chemicals.

This series coincides with recent initiatives found in the U.S. Environmental Protection Agency New Draft Strategic Plan and the National Toxicology Program (NTP) Strategic Roadmap. In the first session, speakers will provide an overview of toxicity testing strategies to advance the use of 21st-century science in chemical safety evaluation. In the second session, speakers will discuss tailoring read-across methodology to address chemical evaluation challenges, explore analysis of environmental toxicants in the environment, and highlight genetic screening tools to examine mechanisms of toxicity. In the third session, presenters will discuss new and emerging strategies for chemical safety evaluation. For more information and to register, see <https://clu-in.org/live>.

ITRC Characterization and Remediation of Fractured Rock - May 17, 2018, 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>.

Combined Remedies: Adaptive, Flexible, 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 for chlorinated solvent sites - with particular emphasis on NPL sites. Participants are encouraged to submit areas of particular interest and/or concern on this topic in advance to balent.jean@epa.gov; organizers will tailor the session materials per these suggestions. For more information and to register, see <https://clu-in.org/live>.

Military Munitions Support Services - The Application of Innovative Technologies to MMRP Projects - June 14, 2018, 1:00 PM-5:00 PM EDT (17:00-21:00 GMT). This session will include a series of presentations on the application of innovative technologies to Military Munitions Response Program (MMRP) projects including: Robotics for Vegetation Clearance, Rapid Chemical Destruction of Bulk and Residual Energetics and Smart Characterization ♦ An HRSC Approach for Determining Preferential Pathways for Complex Sites. For more information and to register, see <https://clu-in.org/live>.

Perspectives on the Implementation of Greener Cleanups - June 28, 2018, 2:00PM-3:30PM EDT (18:00-19:30 GMT). The practice of implementing greener cleanups to secure protective remedies with a lower environmental footprint continues to mature and expand, with greater levels of experience among regulators, site owners, and cleanup professionals alike. Through this webinar we will hear first-hand from individuals in all three sectors on their experiences with actual sites where greener cleanups have been implemented., Three of the projects applied the ASTM Standard Guide for Greener Cleanups (E2893), and represent three major federal agencies involved in site cleanups. We will also learn how greener cleanups are implemented by a corporation owning a portfolio of sites requiring remediation work. 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.

Using Fish Tissue Data to Monitor Remedy Effectiveness, Sponsor: U.S. EPA, Office of Superfund Remediation and Technology Innovation, Archive of Mar 30, 2016 Seminar (2 Hours). This webinar introduced the critical factors for planning and executing an effective fish tissue monitoring program under CERCLA. Topics discussed included choosing species, collection methods, timing of sampling events, number of samples to collect, individual vs composite samples, baseline sampling, and more. Case studies on fish monitoring at the Hudson River and Fox River Superfund sites and lessons learned were also presented. For more information or to replay, visit https://clu-in.org/conf/tio/FishTissue_033016/

> New Documents and Web Resources

Remedial Technology Fact Sheet - Activated Carbon-Based Technology for In Situ Subsurface Remediation (EPA 542-F-18-001). This fact sheet concerns an emerging remedial technology that applies a combination of activated carbon (AC) and chemical and/or biological amendments for in situ remediation of soil and groundwater contaminated by organic contaminants, primarily petroleum hydrocarbons and chlorinated solvents. The technology typically is designed to carry out two contaminant removal processes: adsorption by AC and destruction by chemical and/or biological

amendments. With the development of several commercially available AC-based products, this remedial technology has been applied with increasing frequency at contaminated sites across the country, including numerous leaking underground storage tank (LUST) and dry cleaner sites. It also has been recently applied at several Superfund sites, and federal facility sites that are not on the National Priorities List. This fact sheet provides information to practitioners and regulators for a better understanding of the science and current practice of AC-based remedial technologies for in situ applications (April 2018, 9 pages). View or download at

<https://semspub.epa.gov/src/document/HQ/100001159>.

In Situ Treatment Performance Monitoring: Issues and Best Practices (EPA 542-F-18-002). The purpose of this issue paper is to describe how in situ treatment technologies may impact sampling and analysis results used to monitor treatment performance and provide best practices to identify and mitigate issues that may affect sampling or analysis. This paper discusses eight potential sampling or analytical issues associated with groundwater monitoring at sites where in situ treatment technologies are applied. These issues are grouped under three topic areas: Issues related to monitoring wells (Section 2); Representativeness of monitoring wells (Section 3); Post-sampling artifacts (Section 4) (April 2018, 15 pages). View or download at

<https://semspub.epa.gov/src/document/HQ/100001169>.

ITRC Quality Considerations for Multiple Aspects of Munitions Response Sites.

This web-based guidance document presents quality considerations for munitions response projects. The document explains the decision logic used for a munitions response project and offers resources for planning and monitoring quality assurance/quality control activities to ensure quality data for confidence in decisions. An overview of the munitions response process is presented, as well as particular quality considerations at critical decision points for munitions response projects. The Munition Response Team's first online training class is scheduled for September 18, 2018. Check <https://www.itrcweb.org/training> for further training information. View and use the guidance document at <https://qcmr-1.itrcweb.org>.

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:

- Status Report on Remedy Effectiveness: Hookston Station, Pleasant Hill, California
- Remediation Journal: Spring 2018 OPEN ACCESS Issue on Per- and Polyfluorinated Substances
- First Five-Year Review Report: Hiawatha Boulevard Former Manufactured Gas Plant, Subsite of Onondaga Lake Superfund Site, Onondaga County, New York
- Rapid Assessment of Remedial Effectiveness and Rebound in Fractured Bedrock: ESTCP Cost and Performance Report
- Remediation of the Acidic Groundwater Impacting the Discharge Canal in D Area
- Deep Vadose Zone Treatability Test of Soil Desiccation for the Hanford Central Plateau
- Interaction of Microbial & Abiotic Processes in Soil Leading to the (Bio)Conversion and Ultimate Attenuation of New Insensitive Munitions Compounds
- Taking Nanotechnological Remediation Processes from Lab Scale to End User Applications for the Restoration of a Clean Environment: Project Final Report
- Developing Sediment Remediation Goals at Superfund Sites Based on Pore Water for the Protection of Benthic Organisms from Direct Toxicity to Nonionic

Organic Contaminants

- Exposure Factors Handbook, Chapter 5: Soil and Dust Ingestion, 2017 Update
- T2-Geophysics: A Technology Transfer Program for Facilitating Effective Use of Geophysics for Environmental Characterization and Monitoring at DoD Sites
- Light Non-Aqueous Phase Liquid (LNAPL) Site Management: LCSM Evolution, Decision Process, and Remedial Technologies

EPA Office of Research and Development Journal Article: Geophysical Methods for Monitoring Soil Stabilization Processes. Soil stabilization involves methods used to turn unconsolidated and unstable soil into a stiffer, consolidated medium that could support engineered structures, alter permeability, change subsurface flow, or immobilize contamination through mineral precipitation. Among the variety of available methods carbonate precipitation is a very promising one, especially when it is being induced through common soil borne microbes (MICP ♦ microbial induced carbonate precipitation). Such microbial mediated precipitation has the added benefit of not harming the environment as other methods can be environmentally detrimental. Carbonate precipitation, typically in the form of calcite, is a naturally occurring process that can be manipulated to deliver the expected soil strengthening results or permeability changes. This study investigates the ability of spectral induced polarization and shear-wave velocity for monitoring calcite driven soil strengthening processes. The results support the use of these geophysical methods as soil strengthening characterization and long term monitoring tools, which is a requirement for viable soil stabilization projects. Both tested methods are sensitive to calcite precipitation, with SIP offering additional information related to long term stability of precipitated carbonate. Carbonate precipitation has been confirmed with direct methods, such as direct sampling and scanning electron microscopy (SEM). This study advances our understanding of soil strengthening processes and permeability alterations, and is a crucial step for the use of geophysical methods as monitoring tools in microbial induced soil alterations through carbonate precipitation. View at https://cfpub.epa.gov/si/si_public_record_report.cfm?dirEntryId=338741.

EPA Office of Research and Development Journal Article: The Challenges of PFAS Remediation. Many military bases and their surrounding communities are impacted by contamination with per- and polyfluoroalkyl substances (PFAS) from Aqueous Film-Forming Foams (AFFFs). Soil sorption technologies provide a promising solution to immobilize PFAS in the soil and prevent groundwater and drinking water contamination. This article is the result of a collaborative effort between Battelle and the U.S. EPA to review of the most promising technologies. View at https://cfpub.epa.gov/si/si_public_record_report.cfm?dirEntryId=339749.

EUGRIS Corner. New Documents on EUGRIS, the platform for European contaminated soil and water information. More than 10 resources, events, projects and news items were added to EUGRIS in April 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.

> Conferences and Symposia

Federal Remediation Technologies Roundtable Meeting, Reston, VA, May 9, 2018. FRTR member-agencies meet semi-annually. These meetings offer a unique opportunity for federal cleanup program managers and other remediation community representatives to: Identify and discuss priority cleanup issues, Share lessons learned, and Form collaborative working groups to pursue subjects of mutual interest. The topic

for this meeting will be the Evolution of Subsurface Remediation: Lessons Learned from Technical Challenges to Achieving Cleanup Goals. For more information, see <https://frtr.gov/meetings.htm>.

National Leadership Summit to Take Action on PFAS, Washington, DC, 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. EPA will provide the opportunity for the public to join in a portion of the meeting via streaming online. 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. 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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