U.S. ENVIRONMENTAL PROTECTION AGENCY

TechDirect, May 1, 2021

Welcome to TechDirect! Since the April 1 message, TechDirect gained 52 new subscribers for a total of 39,882. 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

Superfund Redevelopment Program Webinar Series - Optimizing Renewable Energy Reuse on Superfund Sites - May 6, 2021, 1:00PM-2:30PM ET (17:00-18:30 GMT). Renewable energy resources are an important part of America's energy security and environmental sustainability. Development of renewable energy resources combats climate change by replacing carbon-intensive energy sources, reducing greenhouse gas emissions while also providing public and private benefits for communities by creating jobs and promoting sustainable investment. Superfund sites can be well suited for renewable energy production, and EPA has tools and resources available to support site reuse. This webinar will highlight a variety of renewable energy projects and discuss technical assistance available to support renewable energy reuse on Superfund sites. For more information and to register, please visit https://clu-in.org/live.

ITRC Connecting the Science to Managing LNAPL Sites a 3 Part Series - May 11, 27 and June 8, 2021. 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.

Design and Construction Issues at Hazardous Waste Sites Webinar on

Successful Remedial Design, Sessions 1 and 2 - May 12, 2021, 1:00PM-2:00PM EDT (17:00-18:00 GMT) and 2:00PM-3:00PM EDT (18:00-19:00 GMT). The Society of American Military Engineers (SAME) Denver Post and Philadelphia Post along with the US Environmental Protection Agency (EPA) are hosting a series of webinars based on talks given at recent Design and Construction Issues at Hazardous Waste Sites (DCHWS) Symposiums. The mission of the DCHWS symposiums is to facilitate an interactive engagement between professionals from government and the private sector related to relevant and topical issues affecting applications of engineering and science associated with cleaning up hazardous waste sites. The symposiums also serve as a platform to facilitate the exchange of information, encourage dialogue, share experiences, and build and enhance communication among design and construction professionals. Sessions will include presentations on: Site Assessment, Design Considerations, and Performance Results from a Innovative Barrier Application at a Large Chlorinated Plume in Texas and Successful High Density Sludge (HDS) Treatment Plant Design for Acid Mine Drainage. For more information and to register, please visit https://clu-in.org/live.

ITRC TPH Risk Evaluation at Petroleum-Contaminated Sites - May 13, 2021, 1:00PM-3:15PM EDT (17:00-19:15 GMT). The basis for this training course is the ITRC guidance: TPH Risk Evaluation at Petroleum-Contaminated Sites (TPHRisk-1, 2018). The guidance builds on long-standing and current research and experience, and presents the current science for evaluating TPH risk at petroleum-contaminated sites. As a participant in this training you should learn to: recognize the ITRC document as a go-to resource for evaluating TPH risk at petroleum-contaminated sites, recognize how TPH-impacted media interacts with the environment and changes over time, select appropriate analytic method(s) to match site objectives, and apply the decision framework to determine when a site-specific target level may be more appropriate than a generic screening level for TPH. For more information and to register, see https://www.itrcweb.org or https://clu-in.org/live.

Risk e-Learning Webinar Series: Session I - Data Sharing Tools, Workflows, and Platforms - May 17, 2021, 1:00PM-3:00PM EDT (17:00-19:00 GMT). The NIEHS Superfund Research Program (SRP) is hosting a Risk e-Learning webinar series focused on SRP-funded data science projects that are enhancing the integration, interoperability, and reuse of data. With these supplements, the SRP encourages data sharing among its grantees to accelerate scientific discoveries, stimulate new collaborations, and increase scientific transparency and rigor. The first session will introduce tools, strategies, workflows, and platforms developed by SRP researchers to organize existing data obtained from measuring contaminants in an array of environmental media to facilitate interoperability. These strategies were developed to enable researchers to reuse the data to better characterize and understand contaminants present in the environment. We will also hear about the U.S. Environmental Protection Agency's (U.S. EPA's) CompTox Chemicals Dashboard, a compilation of information from many sites and databases developed to organize chemical data and address data gaps. For more information and to register, please visit https://clu-in.org/live.

FRTR at 30 Years: Grand Challenges and Opportunities for Advancing Remediation Technologies, Sessions 1 and 2 - May 19 and 26, 2021, 1:00PM-3:30 pm EDT (17:00-19:30 GMT). The Spring 2021 Meeting of the Federal Remediation Technologies Roundtable (FRTR) will be held as two webinar sessions on May 19 and May 26, 2021. This special 30-year anniversary meeting will convene senior leaders from all FRTR member agencies to discuss progress in remediation programs and opportunities for innovative technology applications at complex sites. As always, FRTR meetings are open to the public. FRTR's objectives for this meeting are to provide an overview of the grand remediation challenges facing member agencies over the next decade, discuss specific technology needs across program and highlight agency

program initiatives to advance technologies that will expedite and improve site cleanup. The first session of the FRTR meeting will focus on "Grand Challenges". This session will consist of a virtual panel discussion by senior-level leaders from the FRTR member agencies involved in site remediation programs. The panel discussion will be facilitated by Dan Powell, Chief of the Technology Integration and Information Branch in U.S. EPA's Office of Superfund Remediation and Technology Innovation. The second session will focus on "Advancing New Technologies". This session will consist of a virtual panel discussion by senior-level leaders from the FRTR member agencies involved in research and application of new and innovative site characterization and remediation technologies at complex sites. The panel discussion will be facilitated by Kent Glover of the U.S. Air Force Civil Engineer Center. Dr. Glover is the Air Force Subject Matter Expert (SME) for Remediation Systems and the FRTR Steering Committee Chair. For more information and to register, please visit https://clu-in.org/live.

Mining Webinar Series: Assessment and Rehabilitation of Humid Region Mine Sites and Wastes - May 18, 2021, 1:00PM-3:00PM EDT (17:00-19:00 GMT). This seminar will review the essential steps and protocols for the assessment and rehabilitation of active and abandoned mining sites in humid regions with examples drawn from the mid-Atlantic USA. In these environments, appropriate stabilization and closure plans must address direct surface revegetation and erosion control along with predicting and controlling adverse water quality discharges. Important site-specific limitations that must be assessed and planned for include (1) avoiding acid-forming materials, (2) minimizing mine soil compaction, (3) ensuring adequate plant moisture supply, and (4) accounting for slope x aspect effects. Due to the net leaching climate, reclamation practitioners must also predict and manage against emission of acid mine/rock drainage in many instances and/or circumneutral high TDS discharges in others. Specific examples will include reclamation of surface coal mines to hayland/pasture or native forests, stabilization and revegetation of acid-forming coal refuse, and return of mineral sands (Ti and Zr) mines to prime farmland row cropping systems. The seminar will cover recommendations for (a) pre-mine closure overburden and soil testing, (b) mine soil reconstruction, (c) basics of AMD/TDS drainage potential prediction, (d) topsoil and organic matter management, and (e) long term soil fertility and pH management concerns. For more information and to register, please visit https://clu-in.org/live.

ITRC Integrated DNAPL Site Characterization - May 25, 2021, 1:00PM-3:15PM EDT (17:00-19:15 GMT). The Integrated DNAPL Site Characterization Team has synthesized the knowledge about dense non-aqueous 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 Vapor Intrusion Mitigation (VIM-1) - June 1 and 15, 2021, 1:00PM-3:00PM EDT (17:00-19:00 GMT). When certain contaminants or hazardous substances are released into the soil or groundwater, they may volatilize into soil gas. Vapor intrusion

(VI) occurs when these vapors migrate up into overlying buildings and contaminate indoor air. ITRC has previously released guidance documents focused on VI, including the "Vapor Intrusion Pathway: A Practical Guidance" (VI-1, 2007) and "Petroleum Vapor Intrusion: Fundamentals of Screening, Investigation, and Management" (PVI, 2014). However, ITRC has received multiple requests for additional details and training on mitigation strategies for addressing this exposure pathway. The ITRC Vapor Intrusion Mitigation Team (VIMT) created ten fact sheets, 16 technology information sheets, and 4 checklists with the goal of assisting regulators during review of vapor intrusion mitigation systems, and helping contractors understand the essential elements of planning, design, implementation, and operation, maintenance and monitoring (OM&M) of mitigation systems. The Vapor Intrusion Mitigation training is a series of eight (8) modules, presented over two sessions. For more information and to register, see https://www.itrcweb.org or https://clu-in.org/live.

Risk e-Learning Webinar Series: Session II - Geospatial Platforms for Analysis and Visualization Across Environmental Data - June 3, 2021, 2:00PM-4:00PM EDT (18:00-20:00 GMT). The NIEHS Superfund Research Program (SRP) is hosting a Risk e-Learning webinar series focused on SRP-funded data science projects that are enhancing the integration, interoperability, and reuse of data. With these supplements, the SRP encourages data sharing among its grantees to accelerate scientific discoveries, stimulate new collaborations, and increase scientific transparency and rigor. In the second session, SRP-funded researchers will describe efforts to combine and analyze datasets using geospatial platforms. These platforms are being used to visualize patterns of exposures and those factors that may affect these patterns, within a geographical area. This session will also feature a speaker supported by the National Science Foundation, who will discuss HydroShare, an online system for sharing hydrologic data and models. For more information and to register, please visit https://clu-in.org/live.

> New Documents and Web Resources

Ecosystem Services Consideration in the Remediation Process for Contaminated Sites. In 2009, the U.S. Environmental Protection Agency's Science Advisory Board recommended activities to advance consideration of ecosystem services (ES) to enhance existing remediation and redevelopment processes in the U.S. This article examines advancements in the decade since, focusing on providing those involved in cleanup of contaminated sites a basic understanding of ES concepts and guidelines for considering ES at cleanup sites using a new, four-step transferable framework. Descriptions, including activities for site teams and case study applications of ES tools, are presented for each step: (1) identify site-specific ES; (2) quantify relevant ES; (3) examine how cleanup activities affect ES; and (4) identify, select, and implement solutions (e.g., Best Management Practices). The goal of this article is to provide site cleanup stakeholders, including project managers, contractors, and site responsible parties, with a stronger foundation and shared understanding to consider ES during the cleanup process for their given site. For more information, please visit https://www.sciencedirect.com/science/article/pii/S030147972100164X?via%3Dihub

US EPA Office of Research and Development Journal Article: Phytostabilization of acidic mine tailings with biochar, biosolids, lime, and locally-sourced microbial inoculum: Do amendment mixtures influence plant growth, tailing chemistry, and microbial composition. Abandoned mine lands present persistent environmental and economic challenges. Remediation, reclamation and revitalization are important steps for overcoming these challenges. The use of plants through

phytostabilization is an elegant and cost-effective reclamation strategy, however, establishing plants on severely degraded contaminated soils can be problematic, and often requires amendments to improve soil/tailing condition and health to facilitate plant establishment and survival. This study evaluated whether amendment mixtures consisting of admixtures of lime, biochar, biosolids, and locally effective microbes (LEM) could alleviate the constraints that hinder phytostabilization success. View more information at https://cfpub.epa.gov/si/si_public_record_Report.cfm?dirEntryId=351523&Lab=CPHEA

US EPA Office of Research and Development Presentation: Development and Testing of Two Polymers for in situ Passive Sampling of Munitions Compounds. Unregulated dumping of unexploded ordnance into coastal waters over the last century has raised questions about the identification and quantification of munitions compounds such as 2,4,6-trinitrotoluene (TNT) and its derivatives in various environmental mediums. Though typically present at low concentrations in seawater and sediment, many of these compounds have known human health risks and potential ecological impacts. Given the low concentrations, passive sampling is a promising avenue of research providing new data on these compounds in an economical and low maintenance way. This work examines two promising polymers, ethylene vinyl acetate (EVA) and polyoxymethylene (POM), for their utility toward detection and quantification of munition freely dissolved concentrations (Cfrees). These samplers will provide a low-cost technique to inform environmental remediation and monitoring programs at military sites and any facility where munitions compounds may be of concern. View more information at https://cfpub.epa.gov/si/si_public_record_Report.cfm?dirEntryId=351523&Lab=CPHEA.

EPA Releases Updated PFBS Toxicity Assessment. In April 2021, EPA announced the release of the final Human Health Toxicity Values for Perfluorobutane Sulfonic Acid (CASRN 375-73-5) and Related Compound Potassium Perfluorobutane Sulfonate (CASRN 29420-49-3). Perfluorobutane sulfonic acid (PFBS) is a member of a larger group of per- and polyfluoroalkyl substances (PFAS). The toxicity assessment is a written summary of the potential health effects associated with PFBS and identifies the dose levels at which those health effects may occur in order to calculate toxicity values. View more information at https://www.epa.gov/pfas/learn-about-human-health-toxicity-assessment-pfbs.

Updated Phytotechnologies Focus Area. Phytotechnologies broadly refers to the use of plants to address contamination in the environment, including soil, groundwater, surface water, sediment, and waste streams such as leachate, acid mine drainage, and wastewater. Phytotechnologies are generally less energy-intensive, and less costly and require less operation and maintenance than more active treatment methods, such as excavation or pump and treat. The CLU-IN Phytotechnologies Focus Area has been updated to reflect the current state of the science, with an emphasis on design and monitoring considerations as well as applications for remediation and containment. Visit the updated Focus Area at https://clu-in.org/phyto.

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:

- Evaluation and Application of the Purge Analyzer Tool (PAT) to Determine In-Well Flow and Purge Criteria for Sampling Monitoring Wells at the Stringfellow Superfund Site in Jurupa Valley, California, in 2017
- Evaluation of Long-Term Performance of Stabilized Sediment for Beneficial Use
- Analysis of Remedial Scenarios Affecting Plume Movement Through a Sole-Source Aquifer System, Southeastern Nassau County, New York
- Application of Horizontal Wells to Enhance Site Remediation

- PITT Findings on PFAS Destruction Technologies
- Review of Available Software for PFAS Modeling Within the Vadose Zone
- Acid Mine Drainage Reduction Efforts Restore Tomhicken Creek
- Nonpoint Source Success Story: Remediating Abandoned Mines Improves Water Quality in Turkey Creek
- Evaluation of Rotating Cylinder Treatment System(TM) at Elizabeth Mine, Vermont
- Best Practices to Prevent Releases from Impoundments at Abandoned Mine Sites While Conducting CERCLA Response Actions

EUGRIS Corner. New Documents on EUGRIS, the platform for European contaminated soil and water information. More than 7 resources, events, projects and news items were added to EUGRIS in April 2021. 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

New Dates! 2021 National Brownfields Training Conference - Oklahoma City, OK, December 8-11, 2021. The National Brownfields Training Conference is the largest event in the nation focused on environmental revitalization and economic redevelopment. Held every two years, the National Brownfields Conference attracts over 2,000 stakeholders in brownfields redevelopment and cleanup to share knowledge about sustainable reuse and celebrate the EPA brownfields program's success. Whether you're a newcomer or a seasoned professional, Brownfields 2021 offers something for you! For more information, please visit https://brownfields2021.org

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.