Technology Innovation News Survey

Entries for January 16-31, 2021

Market/Commercialization Information

HAZARDOUS MATERIALS EMERGENCY PREPAREDNESS (HMEP) TRIBAL

DOT, Pipeline & Hazardous Materials Safety Admin, Funding Opportunity 693JK321NF0004

The HMEP Tribal grant supports the emergency preparedness and response efforts of federally recognized tribes that deal with hazardous materials emergencies, specifically those involving transportation as well as with sections of the Emergency Planning and Community Right-to-Know Act of 1986. Through this program, PHMSA seeks to increase the effectiveness of hazardous materials response and preparedness efforts and reduce risks associated with the bulk transport of highly flammable liquids and other hazardous materials. Six awards are anticipated out of estimated program funding of $1M. Applications are due by March 15, 2021.
https://www.grants.gov/web/grants/view-opportunity.html?oppId=330900

ARCHITECT-ENGINEERING SERVICES FOR COMPREHENSIVE LONG-TERM ENVIRONMENTAL ACTION NAVY (CLEAN VI), NAVFAC PACIFIC

Naval Facilities Engineering Command Pacific, JBPHH, Hawaii.
Contract Opportunities at Beta.SAM, Solicitation N62742-20-R-1802, 2021

This acquisition is solicited on an unrestricted basis under NAICS code 541330. All information needed for interested parties to submit an SF330 (A-E Qualifications) is provided in the notice at beta.sam. This acquisition will result in award of one cost-plus-fixed-fee IDIQ contract for A-E services in support of the Department of the Navy's Environmental Restoration Program. Required services will be performed at various Navy and Marine Corps facilities within the NAVFAC Pacific area of responsibility, predominantly in Hawaii and Guam. The ceiling for this procurement is $239M for duration of a one-year base period and four one-year options. SF330 packages are due by 2:00 PM Hawaii Time on March 18, 2021. https://beta.sam.gov/opp/f74ef1cf94644c4ba7c0421ad8127321/view

$50M MEGA MATOC ERS FOR FUDS FT. DOUGLAS

U.S. Army Corps of Engineers (USACE), Sacramento District, Sacramento, CA.
Contract Opportunities at Beta.SAM, Solicitation W91238-21-R-0021, 2021

This solicitation is issued as a partial small business set-aside under NAICS code 562910. The USACE Sacramento District has an overall target for this MATOC of five IDIQ contract awards, including a small business reserve target of 3-4 awards. The MATOC solicitation/award will be used in part to evaluate responses for both the full and open and small business reserve portions of the solicitation. Continue to monitor beta.SAM for updates. FUDS Fort Douglas will be the seed task order. Attached at beta.SAM are the MATOC PWS and Seed Ft. Douglas PWS and other related documents. Offers are due by 10:00 AM PT on March 24, 2021.
https://beta.sam.gov/opp/d821b34ae7c949719ff62e1be53a778a/view

MEGA FUDS - MMRP MATOC SMALL BUSINESS SET-ASIDE

U.S. Army Corps of Engineers (USACE), Los Angeles District, Los Angeles, CA.
Contract Opportunities at Beta.SAM, Solicitation W912PL21R0008, 2021

This RFP is issued as a total small business set-aside under NAICS code 562910 for a $75M multiple-award task-order IDIQ contract. Up to five contracts may be awarded under this MATOC in support of the U.S. Army Corps of Engineers, primarily within the Los Angeles District for Formerly Used Defense Sites and environmental remediation services throughout California, Nevada, Arizona, New Mexico, and Utah. The first task order is for Borrego Springs in California. Task orders will be issued firm fixed price based on the requirements of the PWS at various known or suspected MMRP or HTRW sites. MATOC duration shall have a 3-year base and one 2-year option. Offers are due by 2:00 PM PT on March 29, 2021. https://beta.sam.gov/opp/38835224ebb64035a2501c47c64a84be/view

MOAB REMEDIAL ACTION CONTRACT - FINAL REQUEST FOR PROPOSAL

U.S. DOE, Environmental Management Consolidated Business Center, Cincinnati, OH.
Contract Opportunities at Beta.SAM, Solicitation 89303320REM000066, 2021

This RFP is a total small business set-aside for procurement of the IDIQ Moab Uranium Mill Tailings Remedial Action Contract (Moab RAC), NAICS code 562910. The maximum value of task orders to be issued is $613M during the 10-year ordering period. Project scope is to relocate mill tailings, associated wastes, and other contaminated materials from the former uranium-ore processing facility site and contaminated materials from one off-site vicinity property in Moab, Utah, to a DOE-constructed engineered disposal facility near Crescent Junction, Utah. See DOE's Moab RAC procurement website for additional information and updates at https://www.emcbc.doe.gov/seb/MoabRAC/. Offers are due by 4:00 PM ET on March 29, 2021.
https://beta.sam.gov/opp/06f9f36cda2f4f7992d6d3d2455579db/view

FY 2021 HAZARDOUS WASTE MANAGEMENT GRANT PROGRAM FOR TRIBES

Environmental Protection Agency, Funding Opportunity EPA-OLEM-ORCR-21-01, 2021

This notice announces the availability of funds and solicits applications from federally recognized tribes or intertribal consortia for the development and implementation of hazardous waste programs and for building capacity to address hazardous waste management in Indian country. In accordance with the EPA Indian Policy of 1984, EPA recognizes tribal governments as the primary parties for managing programs for reservations. Three awards are anticipated out of estimated total program funding of $300,000. The closing date for applications is March 30, 2021. https://www.grants.gov/web/grants/view-opportunity.html?oppId=331154

SENSITIVE AND SPECIFIC DETECTION AND IDENTIFICATION OF BIOLOGICAL TOXINS IN ENVIRONMENTAL SAMPLES

Joint Product Manager (JPM CBRNE A&RS), Aberdeen Proving Ground, MD.
Contract Opportunities at Beta.SAM, Solicitation: biosample, 2021

The JPM for the Chemical, Biological, Radiological, Nuclear and Explosive Analytics and Response Systems at Aberdeen Proving Ground, MD, is conducting market research to identify potential analytical instruments or technologies with the capability to assess for and identify hazardous biological toxins (i.e., biotoxins produced from microorganisms and plants) in environmental samples in a mobile laboratory. The applicable NAICS codes are 334516, 541714, 325414, and 541715. Sources that can provide technologies meeting criteria in this announcement should respond by 5:00 PM ET on March 31, 2021.
https://beta.sam.gov/opp/e969a5fc14174989a1f4010a126da95d/view

Cleanup News

REMEDIATION OF SITES BY IN-SITU STABILIZATION AND EX-SITU SEDIMENT STABILIZATION

EBC Site Remediation and Redevelopment Program, 11 September, Woburn, Massachusetts, 2019

Slides for three presentations, "Remediation via In-Situ Geochemical Stabilization," "Pneumatic Flow Tube Mixing Process (PFTM) for Ex-Situ Contaminated Sediments/Dredged Material Stabilization with Beneficial Use Applications," and "In-Situ Soil Stabilization, MGP Project case study - First ISS Project Permitted in CT," are available for review.
Slides:
https://ebcne.org/wp-content/uploads/2019/09/Presentations-Remediation-of-Sites-by-In-Situ-and-Ex-Situ-Sediment-Stabilization.pdf
Agenda:
https://ebcne.org/wp-content/uploads/2019/08/Final-Agenda-Remediation-of-Sites-by-In-Situ-and-Ex-Situ-Sediment-Stabilization.pdf

METHODOLOGY AND LESSONS LEARNED CONDUCTING IN-SITU BIOREMEDIATION USING AN EMULSIFIED VEGETABLE OIL
Rackow, J. and T. Titus | Environmental Professionals of Arizona 16th Annual Gatekeeper Regulatory Roundup, 4-5 March, Tempe, AZ, 32 slides, 2020

Presentation describes the design, implementation, and performance monitoring of in situ injections of emulsified vegetable oil, *Dehalococcoides*, and vitamin B12 at former dry cleaners to bioremediate groundwater impacted with PCE.
https://www.epaz.org/assets/docs/Conference/2020/2020Proceedings/2020EPAZ_D1_BO3.5_Titus-Rackow.pdf

REMEDIATION OF CONTAMINATED SOIL AND GROUNDWATER USING CHEMICAL REDUCTION AND SOLIDIFICATION/STABILIZATION METHOD: A CASE STUDY
Lu, S.-F., Y.-L. Wu, Z. Chen, T. Li, C. Shen, L.-K. Xuan, and L. Xu.
Environmental Science and Pollution Research [Published online 22 October 2020 prior to print]

A past industrial site in Shanghai, China, was treated for both heavy metals and organic contamination in soil and groundwater. Both laboratory and field tests were conducted to determine the optimum parameters for contaminant removal and found that the remediation goal of hexavalent chromium in soil could be achieved with the mass content of added sodium hydrosulfite and ferrous sulfate reaching 3% + 6%. Total chromium in the groundwater was effectively removed when the mass ratio of sodium metabisulfite was not less than 3 g/L, and the added quick lime raised the pH to ≥9. The concentrations of arsenic and 1,2-dichloropropane in decreased after extraction and mixing of groundwater. Following onsite remediation, the removal efficiency of the contaminants demonstrated that it was feasible to use chemical reduction and solidification/stabilization methods for the onsite, ex situ remediation of this site.

IN SITU STABILIZATION AND SOLIDIFICATION (ISS) + ISCO: BENEFITS OF ADDING SODIUM PERSULFATE TO S/S BINDERS
East Land Quality Forum Webinar, 30 minutes, 23 July, 2020

This presentation reviews the advantages and limitations of combining ISCO and ISS to treat contaminated soil from petroleum hydrocarbon sites. Current literature is reviewed as well as bench and field data demonstrating the successes of ISCO-ISS as a combined remedy. Activated sodium persulfate was found to have chemically oxidized a significant portion of the contaminants of concern (COC) for all the ISCO/ISS treatments, and the mass of COCs oxidized increased with increasing dose. The lowest molecular weight contaminants were preferentially oxidized. For the same Portland cement dose, combined ISCO/ISS treatment was more effective in reducing contaminant leachability than ISS treatment alone because of the COC removal achieved by the ISCO (activated sodium persulfate) component.
Webinar recording: https://vimeo.com/441133516
Slides: http://www.elgf.org/wp-content/uploads/2020/08/ISCO-ISS-elgf-23July20.pdf
More information on the Sollerod Gasaerk MGP project:
https://www.peroxychem.com/media/351469/klozur-sp-case-study-sollerod-denmark-mgp.pdf
More information on the Bolzano, Italy site:
https://www.peroxychem.com/media/350988/PeroxyChem-Klozur-SP-Case-Study-ISCO-ISS-Bolzano.pdf

CASE STUDY TRANSITIONING FROM ACTIVE TO PASSIVE REMEDIATION BY REFINING THE CSM USING EXISTING DATA
Waldron, K., S. Stromberg, and M. Purchase. | Sustainable Remediation Forum Webinar, 25 February, 60 minutes, 2021

Existing data were used to support transition from multiple active remediation systems to MNA at a fuel terminal site in Northern California in an effort to incorporate sustainability and reduce the footprint of cleanup activities. At the time, there were two dual-phase extraction and two oxygen injection systems operating primarily in downgradient areas of the groundwater plume. The nearly 90 monitoring wells were sampled at various frequencies from quarterly to annually. This video takes viewers through the steps of evaluating historical data from these systems to evaluate their effectiveness and to optimize the monitoring network. Results suggested that natural attenuation rates in groundwater exceeded mass discharge and would be able to meet remedial objectives and the well network could be reduced by nearly 40%, and frequency of monitoring decreased to annual.
https://www.youtube.com/watch?v=dbQ13cHBF6k

COMBINED TECHNOLOGIES TO ADDRESS TWO COMPLEX CHLORINATED HYDROCARBON SITES
Fulkerson, M., B. Collins, M. Louth, and M. Perlmutter. | Sustainable Remediation Forum Webinar, 15 December, 60 minutes, 2020

Combined treatment technologies are being implemented to optimize the removal of cVOCs at two sites in eastern North Carolina. One site has a 180-foot deep, 51-acre PCE plume, and the other has a 60-foot deep, 50-acre plume of 1,1,2,2-TeCA and TCE. At each site, source reduction was combined with downgradient treatment and containment, which allowed for implementation flexibility and long-term responsiveness. This presentation focuses on the need for technology combinations to achieve the site remediation action objectives, detail optimization and exit strategies to move the sites towards closure, and highlight the sustainability aspects of these approaches.

Demonstrations / Feasibility Studies

GOWANUS CANAL SUPERFUND SITE. III: LEACHING OF IN SITU STABILIZATION/SOLIDIFICATION MIX DESIGNS
Grubb, D.G., T.M. Himmer, J.L. Gentry, A.J. Salter-Blanc, and C.D. Tsiamis.
Journal of Hazardous, Toxic, and Radioactive Waste 24:4(2020)

An in situ stabilization/solidification (in situ S/S) field pilot was conducted on manufactured gas plant-impacted sediments. Nine mix designs that included 5%-10% by dry weight (wt%) type I/II Portland Cement (PC), type V PC, and NewCem (NC) were used. Naphthalene was the primary contaminant with concentrations ranging from 187-54,500 mg/kg. A mobile NAPL was observed in many of the untreated sediment samples. U.S. EPA Method 1316 testing modified for organics showed that 7 of 9 untreated samples had naphthalene effective solubilities on the order of 11.5-14 mg/L and its leaching was solubility controlled. Leaching of S/S-treated samples using U.S. EPA 1315M was completed in both deionized (DI) water and saltwater (SW) baths to compare the impact of simulated brackish conditions on the leaching of VOCs. Dissolved organic carbon leaching was relatively unaffected by bath type. The naphthalene percent leaching reductions (% LRs) for the top five mixes (> 97% LRs) versus the untreated sediment were 5-14% higher under SW conditions, presumably due to the surface crusts observed. The interval mass releases from the top three mixes under SW conditions were approximately 100 times lower than the corresponding DI water bath values. Because three out of the top five mixes were the 60/40 (w/w) type V PC/NC blend, a minimum dose of 7.5 wt% of this blend was recommended for remedial construction.

FRACTURE FLOW CHARACTERIZATION WITH LOW-NOISE SPONTANEOUS POTENTIAL LOGGING
Kowalski, A.C.G., C.A. Mendonca, and U.S. Ofterdinger.
Groundwater 59(1):16-23(2021)

Preliminary results are presented from a crystalline rock test site on the University of Sao Paulo campus, where researchers aimed to identify fractures contributing to groundwater flow using spontaneous potential measurements generated by electrokinetic processes when the borehole water head is lowered and then monitored while recovering. The electrokinetic model for flow through a tabular gap was used to interpret the measured data and determine the water head difference that drives the flow through the fracture.

EVALUATION OF ATMOSPHERIC SOURCES OF PCDD/FS, PCBS AND PBDES AROUND AN MSWI PLANT USING ACTIVE AND PASSIVE AIR SAMPLERS

Li, M., Y. Zhou, G. Wang, G. Zhu, X. Zhou, H. Gong, J. Sun, L. Wang, and J. Liu.
Chemosphere 274:129685(2021)

The spatial distributions and concentrations of polychlorinated dibenzo-p-dioxins (PCDDs), polychlorinated dibenzofurans (PCDFs), PCBs, and polybrominated diphenyl ethers (PBDEs) in ambient air around a municipal solid waste incineration (MSWI) plant in China were evaluated based on 20 high-volume samples and 27 passive air samples collected 2012-2013. The annual mean sampling rate was approximately 3.2 ± 1.4 m^3/d. Results indicated that the concentrations of PCDD/Fs and PCBs decreased with increasing distance from the emission source and that different sampling sites had slightly different effects. However, this trend was opposite to that observed for PBDEs. Principal component analysis demonstrated that the MSWI emission source was the primary factor for PCDD/Fs in ambient air.

A GEO-CHEMO-MECHANICAL STUDY OF A HIGHLY POLLUTED MARINE SYSTEM (TARANTO, ITALY) FOR THE ENHANCEMENT OF THE CONCEPTUAL SITE MODEL

Cotecchia, F., C. Vitone, F. Sollecito, M. Mali, D. Miccoli, R. Petti, D. Milella, G. Ruggieri, O. Bottiglieri, F. Santaloia, P. De Bellis, F. Cafaro, M. Notarnicola, F. Todaro, F. Adamo, A. Di Nisio, A. M. L. Lanzolla, M. Spadavecchia, M. Moretti, G. Agrosi, F. De Giosa, P. Fago, M. Lacalamita, S. Lisco, P. Manzari, E. Mesto, G. Romano, G. Scardino, E. Schingaro, A. Siniscalchi, G. Tempesta, E. Valenzano, G. Mastronuzzi, N. Cardellicchio, A. Di Leo, L. Spada, S. Giandomenico, M. Calo, V. F. Uricchio, G. Mascolo, G. Bagnuolo, R. Ciannarella, A. Tursi, G. Cipriano, P. Cotugno, L. Sion, R. Carlucci, G. Capasso, G. De Chiara, G. Pisciotta, R. Velardo and V. Corbelli
Scientific Reports 11:4017 (2021)

Geo-chemo-mechanical data gathered through an innovative multidisciplinary investigation in a heavily polluted marine bay is presented. The environmental characterization approach involved experts from several research fields who cooperated to gather new insight into the origin, distribution, mobility, and fate of the contaminants within the basin. The investigation campaign was designed to implement advanced research methodologies and testing strategies to assess the geo-chemo-mechanical properties and the state of seafloor sediment deposits. The integrated approach considered geotechnical engineering; electrical and electronic engineering; geological, sedimentological, mineralogical, hydraulic engineering; and hydrological, chemical, geochemical, and biological fields. Research findings represent conceptual site model inputs and offer a baseline for modeling the evolutionary contamination scenarios within the basin and development of environmental risk management guidance.

Research

COMPARATIVE STUDY OF STABILIZATION/SOLIDIFICATION OF DREDGED SEDIMENTS WITH ORDINARY PORTLAND CEMENT AND CALCIUM SULFO-ALUMINATE CEMENT IN THE FRAMEWORK OF VALORIZATION IN ROAD CONSTRUCTION MATERIAL

Zentar, R., H. Wang, and D. Wang. | Construction and Building Materials 279:122447(2021)

This study evaluated the efficiency of using a calcium sulfo-aluminate (CSA) cement binder to solidify Dunkirk sediments. For comparison, ordinary Portland cement (OPC) was used as a reference. Modified Proctor compaction tests, immediate Californian Bearing Ratio index tests, unconfined compressive strength tests, splitting tensile strength tests, elastic and secant modulus measurements, and mineral and micropore structure analysis were performed on samples containing various types and amounts of the binders. The compaction performance of CSA-/OPC-solidified sediments significantly improved. The mechanical performance of compressive, tensile strength, and elastic modulus increased with binder content and curing time. A model that related the compressive and tensile strength with elastic modulus was used to predict the type or the amount of binder needed for a given suitable set of characteristics. This model also can optimize the amount of binder to reach given properties of solidified sediments, improving the cost of developed material.

HOW IMPORTANT IS ABIOTIC DISSIPATION IN NATURAL ATTENUATION OF POLYCYCLIC AROMATIC HYDROCARBONS IN SOIL?

Liu, J., S. Zhao, R. Zhang, Y. Dai, C. Zhang, H. Jia, and X. Guo.
Science of The Total Environment 758:143687(2021)

Researchers studied the abiotic dissipations of 16 types of PAHs at a past coking site and anthracene (ANT) in various cultivated soils. The contributions of abiotic dissipation to the total attenuation were in a wide range from 11.8-99.7% depending on the types of PAHs. Abiotic dissipation was higher for heavy PAHs (68.3-99.7%) than for light PAHs (11.8-71.5%), with the exception of ANT (80.7%). Similarly, the contribution of abiotic dissipation to ANT attenuation ranged from 30.7-68.6% in eight soils. The abiotic dissipation rate of ANT followed an order that positively correlated with transition metal contents in soils. Findings demonstrated that the abiotic dissipation of PAHs is determined by both molecule properties and soil types.

ENHANCED DISSIPATION OF TRACE LEVEL ORGANIC CONTAMINANTS BY FLOATING TREATMENT WETLANDS ESTABLISHED WITH TWO MACROPHYTE SPECIES: A MESOCOSM STUDY

Hwang, J.-I., F.O. Hinz, J.P. Albano, and P.C. Wilson.
Chemosphere 267:129159(2021)

Removal efficiencies of six contaminants of emerging concern (CECs) were examined over 17 weeks in floating treatment wetland (FTW) mesocosms established with either Japanese sweet flag or canna lilies. The CECs included acetaminophen (APAP), atrazine (ATZ), carbamazepine (CBZ), PFOA, sulfamethoxazole (SMX), and 17β-estradiol (E2). Each treatment was planted with 0, 10, 15, and 20 plants. Dissipation of CECs was greater in planted treatments than in non-planted controls, while the planting number had little effect on dissipation of CECs. All residues of APAP and E2 dissipated rapidly within two weeks in all planted treatments. At the end of the experiment, residues of ATZ and SMX completely dissipated in the canna lily treatments but not in the sweet flag treatments. Moderate dissipation of CBZ was observed in planted treatments, while less dissipation was observed for PFOA. Principal component analysis indicated that aqueous persistency of CECs and species of plants used influenced the dissipation of CECs in FTWs. Of the two species evaluated, canna lily was the more promising plant species.

THE ADDITION OF DEGRADABLE CHELATING AGENTS ENHANCES MAIZE PHYTOREMEDIATION EFFICIENCY IN CD-CONTAMINATED SOILS

Yang, Q., C. Yang, H. Yu, Z. Zhao, and Z. Bai.
Chemosphere 269:129373(2021)

Five chelating agents - ethylenediamine tetraacetic acid (EDTA), diethylenetriacetic acid (NTA), tetrasodium N, N-diacetate (GLDA), aspartate dibutyric acid ether (AES), and iminodisuccinic acid (IDSA) - were used to support phytoremediation with maize and explore the removal effect of Cd in soil. The results showed that chelating agent concentrations of 9 mmol/kg significantly reduced the biomass of maize. Treatment with AES at a dose of 6 mmol/kg significantly increased aboveground biomass. At an AES concentration of 6 mmol/kg, the highest shoot and root Cd levels were observed, which were 3.05 and 1.60 times higher than those of the control. Total Cd extraction followed the order AES (6 mmol/kg) > GLDA > NTA > EDTA > IDSA (3 mmol/kg). Chelating agent treatment significantly increased the activity of antioxidant enzymes and promoted plant growth. The self-degradation of AES significantly reduced soil pH, increased soil Cd activity, and promoted Cd uptake and transportation in maize.

AN INNOVATIVE IN-SITU DRAINAGE SYSTEM FOR ADVANCED GROUNDWATER REACTIVE TREATMENT (IN-DRAIN-TREAT)

Bortone, I., G. Santonastaso, A. Erto, S. Chianese, A.Di Nardo, and D. Musmarra.
Chemosphere 270:129412(2021)

A new remediation technology, In-DRAIN-TREAT that combines the use of advanced drainage systems with adsorption processes takes advantage of the natural gradient and collects contaminated groundwater via a drainage system for treatment in an active cell located downstream. Preliminary results indicate the applicability and efficiency of In-DRAIN-TREAT when compared with a permeable reactive barrier.

TRENDS IN 1,4-DIOXANE ANALYSES: IMPLICATIONS FOR IDENTIFICATION AND CHARACTERIZATION OF CONTAMINATED GROUNDWATER SITES

Adamson, D.T., G. Uhlir, S.R. Rauch, T. Klein, and A.S. Danko.
Groundwater Monitoring & Remediation [Published online 21 January 2021 prior to print]

A meta-analysis was completed using public sampling records from 2000 to 2019 that included >106,000 analyses of 1,4-dioxane from 822 U.S. sites. The 1,4-dioxane detection frequency among all sampling methods was 45%, and the median detected concentration was 10 µg/L. The study found that declining use of the less sensitive Method 8260 and increasing use of the moderately-sensitive Method 8260 SIM contributed to an increase in the 1,4-dioxane detection frequency over time, with a strong correlation between the annual detection frequency and the median reporting limit. Sites where 1,4-dioxane was analyzed but not detected overwhelmingly used less sensitive methods. Given the sub-µg/L groundwater criteria issued for 1,4-dioxane by some regulatory agencies, more sensitive and accurate methods will be increasingly needed to assess compliance.

EFFECT OF WATER-LEVEL FLUCTUATION ON THE REMOVAL OF BENZENE FROM SOIL BY SVE

Shi, J., Y. Yang, H. Lu, B. Xi, J. Li, C. Xiao, Y. Wang, and J. Tang.
Chemosphere 274:129796(2021)

Researchers constructed an experimental device to study the removal of benzene by SVE under fluctuating groundwater levels. Key parameters, such as the extraction flow, extraction time, extraction method, initial soil moisture content, and initial pollutant content, were studied to characterize their effects on the efficacy of benzene removal under stable and fluctuating groundwater levels. The removal rate of benzene by SVE was approximately 10% higher under fluctuating water levels than under stable water levels. Under fluctuating groundwater levels, the removal effect of SVE in the fluctuation zone and stabilization zone was superior to that in the saturation zone.

NEW APPROACHES TO REDUCE SAMPLE PROCESSING TIMES FOR THE DETERMINATION OF POLYCYCLIC AROMATIC COMPOUNDS IN ENVIRONMENTAL SAMPLES

Xia, Z., I. Idowu, E. Kerr, N. Klaassen, H. Assi, H. Bray, C. Marvin, P.J. Thomas, J. Stetefeld, and G.T. Tomy.
Chemosphere 274:129738(2021)

Two approaches to streamlining the processing of sediment and biota for analysis of polycyclic aromatic compounds (PACs), including PAHs, alkyl-PAHs (APAHs), and halogenated PAHs (HPAHs) were validated. The first method is based on one-step in situ extraction/cleanup using accelerated solvent extraction (ASE), in which a mixture of copper, deactivated alumina, and silica gel is added directly to the ASE cell along with sample. The second technique is based on dispersive solid-phase extraction (dSPE) using alumina/silica for cleanup of biota samples to augment conventional ASE extraction combined with gel permeation chromatography. Validation protocols were performed in accordance with the ISO/IEC 17025 guidelines. Results of the validation studies suggest high data quality for both methods and a reduction in sample processing times.

General News

MANAGING CHLORINATED SOLVENTS IN GROUNDWATER USING BIOLOGICAL TREATMENT

Mahendra, S. and D. Lippincott, SERDP & ESTCP Webinar Series, Webinar #128, February 2021

SERDP and ESTCP sponsored webinars that focused on DoD-funded research efforts to biologically treat chlorinated solvents in groundwater. Investigators discussed using a microbial co-culture to rapidly biodegrade mixtures of CVOCs and 1,4-dioxane and implement an in situ co-metabolic biobarrier to treat large, dilute CVOC plumes.
https://www.serdp-estcp.org/Tools-and-Training/Webinar-Series/02-25-2021

TECHNICAL RESOURCES FOR ADDRESSING ENVIRONMENTAL RELEASES OF 1,4-DIOXANE

Interstate Technology and Regulatory Council (ITRC) Web-based document 14d-1, 2021

This ITRC online resource includes 1,4-dioxane fact sheets, a guidance document, and six-part modular training courses. The documents are designed to help state and federal environmental staff, project managers, and other stakeholders to understand1,4-dioxane history and potential sources, regulatory framework, environmental fate and transport, investigation strategies, sampling and analysis, toxicity and risk assessment, and remediation and treatment technologies. https://14d-1.itrcweb.org/

RESEARCH BRIEF 313: NEW MODEL TO EXAMINE PFAS SHEDS LIGHT ON LIPID DISRUPTION MECHANISMS

National Institute of Environmental Health Sciences, Superfund Research Program (SRP), January 2021

Researchers from the Boston University SRP Center developed a novel study design that generated new insight on the effects of PFOA on cholesterol regulation in the liver. The team also investigated the effects of PFOA on the human peroxisome proliferator activated receptor α (hPPARα), a transcription factor that regulates lipid homeostasis. The research provides essential new information to understand the mechanism(s) by which PFAS can affect the amount of lipids in blood.
https://tools.niehs.nih.gov/srp/1/ResearchBriefs/pdfs/SRP_ResearchBrief_313_508.pdf

IN SITU THERMAL REMEDIATION FOR SOURCE AREAS: TECHNOLOGY ADVANCES AND A REVIEW OF THE MARKET FROM 1988-2020

Horst, J., J. Munholland, P. Hegele, M. Klemmer, and J. Gattenby.
Groundwater Monitoring & Remediation [Published online 24 January 2021 prior to print]

The review picks up from the conclusion of a previous comprehensive review on in situ thermal remediation (ISTR, see https://books.google.com/books/about/A_Critical_Evaluation_of_In_situ_Thermal.html?id=T1rOvgEACAAJ&hl=en&output=html_text) to discuss vendor evolution, the growth of the market for ISTR, related application trends, advancements, and thoughts on where the ISTR market may be headed in the next 10 years. The review includes a fresh look at the sustainability and resilience profile for ISTR.

BIOREMEDIATION FOR ENVIRONMENTAL SUSTAINABILITY APPROACHES TO TACKLE POLLUTION FOR CLEANER AND GREENER SOCIETY

Kumar, V., G. Saxena, and M.P. Shah (eds.). Elsevier, ISBN: 978-0-12-820318-7, 504 pp, 2020

This book discusses many recently developed and successfully applied bio/phytoremediation technologies to control and minimize pollution. It describes the scope and applications of the technologies, focusing on associated eco-environmental concerns, field studies, sustainability issues, and future prospects. It also examines the feasibility of environmentally friendly and sustainable bio/phytoremediation technologies to remediate contaminated sites and future directions in the field of bioremediation for environmental sustainability. *See the abstract and a list of chapters at* https://doi.org/10.1016/C2019-0-01166-1.

PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS): INCINERATION TO MANAGE PFAS WASTE STREAMS
EPA Technical Brief, 2pp, 2020

EPA is currently considering multiple disposal techniques, including incineration, to effectively treat and dispose of PFAS wastes. This factsheet presents options and considerations for the disposal of PFAS wastes via incineration and addresses gaps in research for PFAS waste.
https://www.epa.gov/sites/production/files/2019-09/documents/technical_brief_pfas_incineration_ioaa_approved_final_july_2019.pdf

COMPARISON OF CURRENTLY AVAILABLE PFAS REMEDIATION TECHNOLOGIES IN WATER: A REVIEW
Wanninayake, D.M. | Journal of Environmental Management 283:111977(2021)

This review gives extra consideration to novel advanced techniques for a wide array of PFAS classes and compares their efficiencies, effectiveness, energy use, sustainability, cost, and simplicity in lab-scale to field applications. Electrochemical, sonochemical, advanced oxidation processers, and plasma, together with novel hybrid techniques, are considered effective approaches for PFAS removal, including long-chain and some short-chain PFAS and PFAAs. Careful selection of a combined effective treatment methodology in an integrated processing unit would be a revolutionary approach to eliminate PFAS from the environment. Considering site-specific water quality parameters and community perspectives will make them more viable in real-world field applications.

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