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
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 SFO30 (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/oppp/tf74ef1cf94644da57c0451d8827321/view

$50M MEGA MATOC ERS FOR FUDS FT. DOUGLAS
U.S. Army Corps of Engineers (USEA), 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 reserve business portion 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/oppp/d82154a77c6934f77169620e1be55a77a/view

MEGA FUNDS - 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 W912PL21R00008, 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/oppp/38835224eb664035a2501c47c764a84be/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.emcbo.doe.gov/seb/MoabRAC. Offers are due by 4:00 PM ET on March 29, 2021. https://beta.sam.gov/oppp/00df936cd2a2f7992d6ad5455799d9b/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/oppp/e969a5fc14174989a1fd01a126da95d/view

Cleanup News

REMEDIAION OF SITES BY IN-SITU STABILIZATION AND EX-SITU SEDIMENT STABILIZATION
ECB Site Remediation and Redevelopment Program, 11 September, Woburn, Massachusetts, 2019
Identification fractures contributing to groundwater flow using spontaneous potential measurements generated by electrokinetic processes. 

Groundwater 59(1):16-23 (2021) 

FRACTURE FLOW CHARACTERIZATION WITH LOW-NOISE SPONTANEOUS POTENTIAL LOGGING

under SW conditions, presumably due to the surface crusts observed. The interval mass releases from the top three mixes under SW naphthalene percent leaching reductions (% LRs) for the top five mixes (> 97% LRs) versus the untreated sediment were 5-14% higher simulated brackish conditions on the leaching of VOCs. Dissolved organic carbon leaching was relatively unaffected by bath type. The samples using U.S. EPA 1315M was completed in both deionized (DI) water and saltwater (SW) baths to compare the impact of naphthalene effective solubilities on the order of 11.5-14 mg/L and its leaching was solubility controlled. Leaching of S/S-treated of the untreated sediment samples. U.S. EPA Method 1316 testing modified for organics showed that 7 of 9 untreated samples had Naphthalene was the primary contaminant with concentrations ranging from 187-54,500 mg/kg. A mobile NAPL was observed in many designs that included 5%-10% by dry weight (wt%) type I/II Portland Cement (PC), type V PC, and NewCem (NC) were used.

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 untreated sediment samples. U.S. EPA Method 1316 testing modified for organics showed that 7 of 9 untreated samples had 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


Groundwater 59(1):16-23 (2021)

Preliminary results are presented from a crystalline rock test site on the University of Sao Paolo campus, where researchers aimed to identify contributing to groundwater low-noise spontaneous potential logging when the borehole water level 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

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 1.4 m³/d. Results indicated that 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

Geo-chemo-mechanical data gathered through an innovative multidisciplinary investigation in a heavily polluted marine bay is presented. The environmental characterization approach involved 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 sealife 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 SULFATE-DIAMINEMONOAMINE CEMENT IN THE REBRA FOUNDATION ROAD CONSTRUCTION MATERIAL

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 California Bearing Ratio index tests, unconfined compressive strength tests, splitting tensile strength tests, elastic and secant modulus measurements, and material and microstructure 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 of 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?

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%). Soil pH was also an important factor that affected the abiotic dissipation of PAHs. The anthracene 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

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. 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 lilies 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

Five chelating agents - ethylenediamine tetracetic acid (EDTA), diethylenetriacetic acid (NTA), tetrasodium N, N-diacte (GLDA), ascorbic acid ethier (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 9 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 transport in maize.

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


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**


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**


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.


**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 understand 1,4-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/](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.


**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://tools.niehs.nih.gov/srp/1/ResearchBriefs/pdfs/SRP_ResearchBrief_313_508.pdf](https://tools.niehs.nih.gov/srp/1/ResearchBriefs/pdfs/SRP_ResearchBrief_313_508.pdf)) 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**


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](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.

COMPARISON OF CURRENTLY AVAILABLE PFAS REMEDIATION TECHNOLOGIES IN WATER: A REVIEW

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 processors, 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.

The Technology Innovation News Survey welcomes your comments and suggestions, as well as information about errors for correction. Please contact Michael Adam of the U.S. EPA Office of Superfund Remediation and Technology Innovation at adam.michael@epa.gov or (703) 603-9915 with any comments, suggestions, or corrections.

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