### Technology Innovation News Survey

**Entries for March 16-31, 2021**

#### Market/Commercialization Information

**MEASUREMENT AND MONITORING METHODS FOR AIR TOXICS AND CONTAMINANTS OF EMERGING CONCERN IN THE ATMOSPHERE**

Environmental Protection Agency, Funding Opportunity EPA-G2021-STAR-CL1

As part of its Science to Achieve Results (STAR) program, EPA is seeking applications proposing research to advance air measurement and monitoring methods for air toxics and contaminants of emerging concern in the atmosphere. Specifically, this RFA seeks research that will provide advancements in (1) techniques for real-time, continuous measurements of concentration limits and detection limits, below background concentrations or health risk-based thresholds; and (2) stationary or mobile near-source measurement methods for quantifying emission rates of fugitive emissions. Two awards are anticipated out of a total $2.4 million program funding. The closing date for applications is June 7, 2021.

#### USASE TULSA DISTRICT RFP FOR $50M SERVICE-DISABLED VETERAN-OWNED SMALL BUSINESS SET-ASIDE IDC MATOC FOR ERS PROJECTS

U.S. Army Corps of Engineers (USACE), Tulsa District, Tulsa, OK

This acquisition is a service-disabled veteran-owned small business (SDVOSB) set-aside under NAICS code 562910. The USASE Tulsa District anticipates awarding up to 10 indefinite-delivery contracts (IDCs) with a maximum shared capacity of $50M under a firm-fixed-price IDC (multiple-award task order contract) for environmental remediation projects assigned to the USASE Tulsa District. The IDCs awarded will be firm-fixed price for control and remediation of environmental contamination from petroleum, toxic substances, radioactive materials, hazardous materials, munitions and explosives of concern, and munitions constituents. Proposals are due no later than 3:00 PM CT on May 30, 2021.

#### USACE ALBUQUERQUE DISTRICT RFP FOR $50M 8(a) NATIONWIDE IDC MATOC FOR ENVIRONMENTAL REMEDIATION SERVICES PROJECTS ASSIGNED TO THE RPEC

U.S. Army Corps of Engineers (USACE), Albuquerque District, Albuquerque, NM

Contract Opportunities at Beta.SAM, Solicitation W912XK-21-R0021

From this solicitation the Government intends to award a MATOC (multiple-award task order contract) with a target of up to five contracts to a possible combination of small business, 8(a) small business, and offerors on an unrestricted basis under NAICS code 562910. At least three IDIQs will be set aside for small business. The IDIQ MATOC shall have a shared capacity of $50M for non-remote services and $10M for remote services for Environmental Remediation Services (ERS) projects within the geographic boundaries of the USASE Pacific South Division (SPD) and the USASE Pacific West Division (PWD). The ERS IDIQs may include control and remediation for environmental contamination from petroleum, toxic substances, radioactive materials, hazardous materials, munitions and explosives of concern, and munitions constituents. Proposals may address regulated, non-regulated toxic substances, and emerging contaminants. Proposals are due by 3:00 PM CT on June 29, 2021. All questions must be asked in Bidders Inquiry as described in the solicitation.

#### MULTIPLE ENVIRONMENTAL GOVERNMENT ACQUISITION FORMERLY USED DEFENSE SITES (FUDS), AND MILITARY MUNITIONS RESPONSE PROGRAM (MMRP)

U.S. Army Corps of Engineers (USACE), Los Angelos District, Los Angeles, CA

Contract Opportunities at Beta.SAM, Solicitation W912XK-21-R0009

This solicitation is full and open. The Government intends to award one Regional Pacific South Division (SPD) IDIQ MATOC (multiple-award task order contract) with a target of up to five individual contracts as a result of this solicitation for a total value of $49.8M. The IDIQ MATOC will be for environmental remediation services at FUDS and MMRP sites under NAICS code 562910, in support of the U.S. Army Corps of Engineers, primarily within the Los Angeles District (California, Nevada, and Arizona), SPD, and existing SPD customers. Task orders will be issued on the requirements at known or suspected MRRP or HTW sites at the following locations that may address regulated, non-regulated toxic substances, and emerging contaminants. Proposals are due by 3:00 PM CT on June 30, 2021. Offers are advised that funds are not currently available for this acquisition.

**Clean Up News**

**QUANTIFYING HYDRAULIC CONDUCTIVITY SPATIAL VARIABILITY FOR CEMENT-BASED SOLIDIFICATION/STABILIZATION (S/S) REMEDIATION PROJECT: CASE STUDY**


The goal of this analysis was to characterize the spatial variability of hydraulic conductivity in an existing cement-based solidification/stabilization system. The sampling recommendations for the case study area were intended to provide a full range of hydraulic conductivity values (K)—support projects assigned to the USASE Southwestern Division Regional Environmental and Natural Resources Management Center (RQAC) to complete the development of a probabilistic database in support of the Southwestern Division Remediation Project. The database may be used to assess the reliability of绝望 hydraulic conductivity and, equally important, the accuracy of the K values. The idea of this project is to generate a probability distribution of K values for the region, which may be used to guide the development of a probabilistic database for the division. This probabilistic database may be used to support environmental remediation projects and may improve the understanding of the character of the soil and the site. The database may also be used to support environmental remediation projects and may improve the understanding of the character of the soil and the site. The database may also be used to support environmental remediation projects and may improve the understanding of the character of the soil and the site.

**CASE STUDY: NEW DELIVERY METHOD TO INJECT REMEDIAL AMENDMENTS INTO A DIFFICULT AQUIFER**

Jin, S. | DOWW 2021 Design and Construction at Hazardous Waste Sites Virtual Symposium, 29-30 March and 1 April, Virtual, 21 slides, 2021

A case study of a former fueling station site in Canada where two different in situ remediation techniques to treat PHCs failed is presented. Potential reasons for the failed remedial efforts are proposed, and insights are offered on avoiding failure and maximizing success for in situ remediation. The presentation highlights the collection of additional site data for selection and application of an alternative remediation approach, as well as the execution and management of the associated risk. Installation of the source area was not required. However, the injection of surfactants to facilitate the injection of the reactive barrier was installed to prevent the continued offsite migration of the PHC plume at a busy downgradient barrier.

**UTILIZING A LOW-INTENSITY ELECTROCHEMICAL-BASED TECHNOLOGIES FOR TREATING PERSISTENT CHLORINATED VOLATILE ORGANIC COMPOUNDS IN TIGHT SUBTERRANEAN MATRIX**

Harold, G. | I. Smart Remediation, 23 January, Toronto, Ontario, Canada, 45 slides, 2020

A case study of a former chemical manufacturing facility in New Jersey, resulting in redevelopment of the property for multiple uses as a Brownfields site. The site was evaluated using existing groundwater extraction and treatment system that was providing migration impacts to the adjacent residential neighborhood. The site was composed of two dual contaminant areas (CCA and vinyl chloride), and the post treatment analysis of potential remedial alternatives applied to the RCAs.

**APPLICATION OF MULTIPLE REMEDIAL TECHNIQUES AND APPROACHES AT A FORMER PHARMACEUTICAL MANUFACTURING FACILITY**

Russell, D.J. | DOWW 2021 Design and Construction at Hazardous Waste Sites Virtual Symposium, 29-30 March and 1 April, Virtual, 22 slides, 2021

Multiple technologies were used to address environmental risk receptors at a former pharmaceutical manufacturing facility in New Jersey, resulting in redevelopment of the property for multiple uses as a Brownfields site. The site was evaluated using existing groundwater extraction and treatment system that was providing migration impacts to the adjacent residential neighborhood. The site was composed of two dual contaminant areas (CCA and vinyl chloride), and the post treatment analysis of potential remedial alternatives applied to the RCAs.

**REMEDICATION OF THE MARWELL TAR PIT SITE, WHITEHORSE, YUKON**

Horbath, D. | P. Inglis, | Smart Remediation, 4 February, Virtual, 21 slides, 2020

A risk-based remediation strategy was developed for the Marwell Tar Pit site, which contained approximately 30,000 m3 of hydrocarbon-contaminated soil, largely consisting of tar that remained from an old oil refinery. Several soil remediation methods were assessed, but onsite thermal desorption was selected based on several factors, including technical feasibility, reliability, public and regulatory acceptability, and cost. The presentation summarized the technical challenges that were overcome through the application of the technology and its use in northern Canada, including significant concerns from the local population about the impact on air quality both before and during the restoration works. Air quality monitoring during the project and a discussion to address the concerns of the local population are covered.

**Demonstrations / Feasibility Studies**

**ADVANCES IN ANAEROBIC BENZENE BIOREMEDIATION: MICROBES, MECHANISMS, AND BIOTECHNOLOGIES**


A field pilot test examining benzene biodegradation using DDB-B regression was conducted in November 2019 at a site in Saskatchewan contaminated with BTEX. The pilot test included three cycles of benzene addition, where analysis was conducted on the DDB-B culture, which served as control, and on a received culture, which served as control. The results were compared to the received culture. The results showed that the control cultures were not effective in promoting benzene degradation. These first-to-field projects will establish clear guidelines and approaches for using bioremediation cultures, including a better understanding of conditions that promote biodegradation of contaminants. Results from these first-to-field projects will establish clear guidelines and approaches for using bioremediation cultures, including a better understanding of conditions that promote biodegradation of contaminants.

**CHANGE IN THE BINDING FORM OF COPPER AND ZINC IN SEWAGE FIELD SOIL BY ADDITION OF BIOCHAR AFTER EIGHT YEARS OF FIELD EXPOSURE**

Changes in the binding form of copper and zinc after eight years of field exposure to 0 and 5% biochar were examined in a field trial. Rids with 5% biochar tended to have lower concentrations of copper at a percentage of the total contents in fractions V–III (1 m bold). It is easy to supply, 18 bound to Mn (red) compared to the plots without biochar addition. In fractions V and IV | Claro, 0% biochar treatment did not significantly affect the soil's cation exchange capacity and is illustrated by the biochar significantly higher percentages of copper. Changes in the copper-binding form were not clearly ascertainable in plots with recent biochar addition. For zinc, only fractions I and VI were quantified for zinc in all the other fractions. These effects were also present, directly after biochar addition. Therefore, biochar appears to be a suitable additive to immobilize zinc and especially copper.  

https://presentations.cgce.co.uk/EG/20020/EG200203176E_presentations.pdf

In situ bioremediation of the source zone for chlorinated solvents in groundwater - successes and challenges
LaPit-Polasko, L. and M. Hayes. | 16th Annual Gatekeeper Regulatory Roundup 4-S State, virtual, 37 slides, 2020

In situ bio remediation was conducted to remediate two plumes containing cVOCs and 1,4-dioxane in the groundwater at an aluminum pipe manufacturing company. A treatment zone was established using a bioremediation system upgradient of source area. A quick-release carbon substrate was injected to biostimulate microbes, followed by injection of a slow-release carbon substrate to support extended bio remediation of cVOCs.  


Time-lapse electrical resistivity tomography (ERT) was used to map remediation of coal at a site undergoing full-scale application of self-sustaining treatment for active remediation (STAR) – a combination of electrokinetics (EK) and ERT. STAR complemented the conventional methods by (i) delineating the chlorinated solvent plume and related ground water zones, (ii) collecting data on the behavior of the injected oxidant, the magnetic field survey visually showed the dynamic distribution of the injected oxidant. Flow pathways and flow behavior were assessed accordingly. Over the course of the field study combined with the monitoring of well samples helped explain abnormal changes in the electrical conductivity of the observation wells and supported the use of the magnetic field survey technology to monitor ISCO injections.

Research

Portable mercury detector testing and evaluation report
Office of Research and Development, EPA 600/R-20/019, 39 pp, 2020

This project provided credible information to select and implement technologies to protect human health and the environment during a response and remediation effort following a spill or other release to the environment. The performance of five commercially available portable Hg detectors (Ametek Arizona Instrument’s Jerome J405, Jerome J505, and Lumen-Ra RA-915) and four handheld devices (Palmex RA 915 M, Palmex RA 915+, PMI 10, and D&D Instruments’ J505) were assessed for accuracy and efficacy during simulated spills. The Jerome J505 had a response time of 2 to 6 minutes. However, for Hg clearance purposes, the response time is likely not a concern.  

https://cfpub.epa.gov/si/si_public_file_download.cfm?p_download_id=53990

Portable Mercury Detector Testing and Evaluation Report

Hydrothermal alkali treatment for destruction of per- and polyfluoroalkyl substances in aqueous film-forming foam

This study evaluated the hydrothermal treatment of diverse PFASs present in aqueous film-forming foam (AFFF). Quantitative and semiquantitative high-resolution mass spectrometry analyses of PFASs demonstrated a rapid degradation of all 109 PFASs identified in two AFFFs (sulfonate- and fluorotelomer-based formulations) in water amended with an alkali at near-critical temperature and pressure. Over 90% of PFASs were degraded to nondetectable levels within 15 min, while the most recalcitrant perfluorosulfonates underwent degradation within 30 min when treated with 5 M NaOH. 

HFR nmr spectroscopic analysis and fluorine ion analysis confirmed the near-complete defluorination of PFASs in both chelate and concentrated AFFF mixtures. No stable volatile perfluorohydrocarbon species were detected in reactor headspace gases by the gas chromatography-mass spectrometry analysis. These findings indicated a significant potential for application of hydrothermal treatment technologies to manage PFAS waste streams.

Benificial traits of root endophytes and rhizobacteria associated with plants growing in phytomanaged soils with mixed trace metal-polyaromatic hydrocarbon contamination

The objective of the study was to obtain bacterial inoculants from phytomanaged soils at a site in France contaminated with trace metals (TMs) and PAHs. After determining root endophytic and rhizosphere populations of oxidizing hydrocarbon strains with a prevalence of the population of oxidizing hydrocarbon strains with a prevalence of the population of oxidizing hydrocarbon strains with a prevalence of the population of oxidizing hydrocarbon strains with a prevalence of the population of oxidizing hydrocarbon strains with a prevalence of the population of oxidizing hydrocarbon strains with a prevalence of the population of oxidizing hydrocarbon strains with a prevalence of the population of oxidizing hydrocarbon strains with a prevalence of the population of oxidizing hydrocarbon strains with a prev...
Wolff, P., J.D. Willson, and B.A. DeGregorio. | SERDP & ESTCP Webinar Series, Webinar #132, April 2021

On April 22, SERDP and ESTCP sponsored webinars focusing on DoD-funded research efforts to improve the management and recovery of threatened, endangered, or at-risk species on DoD installations. Specifically, investigators talked about a subsurface passive acoustic monitoring tool to document the occurrence and abundance of at-risk underwater-calling frogs and a simulation-based method for estimating the density and abundance of secretive snakes. [https://www.serdp-estcp.org/Tools-and-Training/Webinar-Series/04-22-2021]

PERFORMANCE ASSESSMENT OF PAST BIOREMEDIATION APPROACHES FOR CHLORINATED SOLVENT SOURCE ZONES

Two approaches were used to evaluate the success or failure of different bioremediation applications and to evaluate factors that may have contributed to those outcomes. Fifteen sites with chlorinated ethenes as the primary contaminant were selected that were treated using common bioremediation techniques and had data that allowed statistical evaluation of remedial performance over time. Sites with extensive pre- and post-treatment data were prioritized, and overburden aquifers were selected over bedrock aquifers. Statistical analyses of the large database were performed to identify factors that may promote or prevent successful application of bioremediation strategies. Assessment tools were applied, and additional well sampling was conducted at 5 of the 15 sites to quantify contaminant mass flux, the presence of key dehalogenating organisms and genes, and determine whether biodegradation was still occurring. Pre-treatment data and post-treatment data were compared with information on site conditions and treatment methods. The data were used to draw conclusions about the long-term effectiveness of VOC bioremediation. [https://www.serdp-estcp.org/content/download/53165/523129/file/ER-201427-FinalReport.pdf]

APPLICATION OF BIOCHAR-BASED MATERIALS IN ENVIRONMENTAL REMEDIATION: FROM MULTI-LEVEL STRUCTURES TO SPECIFIC DEVICES

This review summarizes recent progress on the theoretical investigation and engineering applications of biochar materials in environmental remediation. The summary includes structure-application relationships and structural properties of biochar from macroscopic and microscopic aspects. The review also highlights important progress on the functionalization and device of biochar-based materials, including magnetic biochars, 2D and 3D biochar-based macrostructures, immobilized microorganisms on biochar, and biochar-amended biofilters, and evaluates the environmental friendliness and sustainability of biochar-based materials from synthesis to application. This paper is Open Access [https://link.springer.com/article/10.1007/s42773-020-00041-7]

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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