Technology Innovation News Survey

Entries for June 1-15, 2020

Market/Commercialization Information

REQUEST FOR PROPOSAL FOR THE IDAHO CLEANUP PROJECT PROCUREMENT

U.S. DOE, Environmental Management Consolidated Business Center, Cincinnati, OH.
Contract Opportunities at Beta.SAM, Solicitation 89303319REM000034, 2020

This acquisition is unrestricted and contains no small business set-aside provisions. The NAICS code is 562910. The Department of Energy has released the final RFP for the Idaho Cleanup Project Radioactive Waste Management Complex Closure and Other Mission Objectives procurement through its ICP procurement website at https://www.emcbc.doe.gov/SEB/icp/rfppage.php. Monitor that website for updates and answers to questions. Offers are due by 3:00 PM ET on July 28, 2020. https://beta.sam.gov/opp/1bd730b063c34c5cba5a2b7d18f68d71/view

ESTIMATING CHILDREN'S SOIL/DUST INGESTION RATES FOR EXPOSURE SCIENCE

Environmental Protection Agency, Funding Opportunity EPA-G2020-STAR-D1, 2020

EPA, as part of its Science to Achieve Results (STAR) program, is asking the scientific community to propose transdisciplinary research to develop or apply innovative approaches/methods concerning chemical exposures via soil and dust ingestion for children aged 6 months through 6 years to improve estimates, better characterize variability, and reduce uncertainty. Up to six awards are expected out of total estimated program funding of $8.1M. Award ceiling: $1,350,000. The closing date for applications is August 5, 2020.
https://www.grants.gov/web/grants/view-opportunity.html?oppId=322254

EPA ANNOUNCES $3 MILLION IN FUNDING FOR SMALL BUSINESSES TO DEVELOP ENVIRONMENTAL TECHNOLOGIES

U.S. EPA News Release, 3 June 2020

EPA has provided $3M in Phase 2 SBIR funding to develop innovative environmental technologies for nine small businesses that previously received a Phase I award of $100,000. Phase 2 funding will aid the companies in further development and commercialization of their technologies. Among the nine awards are four technologies with potential uses in environmental remediation of per- and polyfluoroalkyl substances (PFAS):

1. Faraday Technology Inc., Englewood, Ohio, to develop electrochemical extraction and remediation of PFAS in soils as well as electrochemical pretreatment of PFAS-contaminated wastewater and landfill leachate streams.
2. framergy Inc., College Station, Texas, to develop a novel water treatment technology to break down and mineralize PFAS.
3. Polykala Technologies LLC, San Antonio, Texas, to develop "smart" polymer nanofiber mats for selective and efficient removal of PFAS from wastewater.
4. 2WiTech LLC, San Diego, California, to develop a low-cost portable sensing technology for detecting trace amounts of PFOA and PFOS in water.

https://www.epa.gov/newsreleases/epa-announces-3-million-funding-small-businesses-develop-environmental-technologies-0

INTERNATIONAL REMEDIATION ENVIRONMENTAL SERVICES - GEN TWO (IRES2)

U.S. Army Corps of Engineers, W2V6 Engineering and Support Center, Huntsville, AL.
Contract Opportunities on Beta.Sam.gov, Solicitation PANHES-20-P-0000-000391, 2020

The U.S. Army Corps of Engineers Huntsville Engineering and Support Center, Ordnance & Explosives Directorate, is planning an acquisition for the procurement of International Remediation and Environmental Services - Generation Two (IRES2). The multiple-award task-order IDIQ contract will be a hybrid consisting of both FFP and CPFF task orders due to the complexity of the work and issues yet unknown. The total shared capacity is $750M with a period of performance of five years (36-month base and two 12-month options). This notice is issued to provide an update on the future solicitation for IRES2. The estimated milestones are as follows: Issue Synopsis - May FY21; Issue RFP - June FY21; Award Date - August FY22.
https://beta.sam.gov/opp/4e5d5a2435a947cba63eeec356242e63/view

NASA TECHNOLOGY TRANSFER OPPORTUNITIES

NASA Headquarters, Washington, DC.
Contract Opportunities at Beta.SAM, 2020

NASA's Technology Transfer Program solicits inquiries from companies interested in obtaining license rights to commercialize, manufacture, and market the following technologies. **•Tool for Rapid Identification of TCE in Plants** (MFS-TOPS-53): In collaboration with the State University of New York and the Naval Research Laboratory, Marshall Space Flight Center is developing a hyperspectral estimator to detect the solvent TCE in plants as a nondestructive, quick, and lower-cost way to screen for TCE across large areas. Submit a license application at https://technology.nasa.gov/patent/MFS-TOPS-53. This opportunity is open until April 30, 2021. Solicitation T2P-MSFC-00029:
https://beta.sam.gov/opp/cda839f3985d4f8498964bb214f123b7/view
•Emulsified Zero-Valent Iron (EZVI) (TOP10-74): Developed at the John F. Kennedy Space Center, this process provides for effective and cost-competitive in situ treatment of DNAPLs. Submit a license application at https://technology.nasa.gov/patent/TOP10-74. This opportunity is open until February 3, 2021. Solicitation T2P-KSC-00029:
https://beta.sam.gov/opp/e4f0b27dff4c4d099fdf4a3ca426ebc5/view
•Compact Sensor for In-Situ Gas Species Determination and Measurement (MFS-TOPS-32) Marshall Space Flight Center researchers have developed a compact, lightweight, integrated gas sensor capable of monitoring and detecting leaks in real time. The fiber-optic, laser-based leak detector uses an array of interferometric and spectroscopic techniques to measure gas density, temperature, species determination, and species concentrations. It consumes very little power. Submit a license application at https://technology.nasa.gov/patent/MFS-TOPS-32. This opportunity is open until February 3, 2021. Solicitation T2P-MSFC-00025: https://beta.sam.gov/opp/496786b91238439199984584144463e3bf/view
•Filtering Molecules with Nanotube Technology (MFS-TOPS-29) Innovators at Johnson Space Center have identified a method to create a filtration device to eliminate contaminants from water supplies. The unique aspect of the technology is its use of acoustics rather than pressure to drive water through small-diameter carbon nanotubes. Submit a license application at https://technology.nasa.gov/patent/MSC-TOPS-29. This opportunity is open until March 17, 2021. Solicitation T2P-JSC-00008:
https://beta.sam.gov/opp/ea495170c440462983d6b76e7134cf2/view

Cleanup News

FIRST MONITORED NATURAL RECOVERY REPORT, DATA COLLECTIONS 2013-2016 PALOS VERDES SHELF, OPERABLE UNIT 5 OF THE MONTROSE CHEMICAL CORPORATION SUPERFUND SITE, LOS ANGELES COUNTY, CALIFORNIA

EPA Region 9, 162 pp, 2018

A sampling and analysis program was conducted at Palos Verdes Shelf (PV Shelf) in support of monitored natural recovery (MNR) of DDT and PCBs that migrated to the PV Shelf from industrial discharges in the 1960s and formed a bed of "effluent affected" sediment. Although conditions at PV Shelf appear to be improving, significant areas of sediment remain highly contaminated, and DDT and PCBs concentrations in samples of water and fish exceeded cleanup goals. EPA will continue the MNR sampling program to evaluate the effectiveness of MNR and to develop final remediation alternatives for PV Shelf cleanup. https://semspub.epa.gov/work/09/100008054.pdf

LONG-TERM INVESTIGATION ON THE REMOVAL OF PERFLUOROALKYL SUBSTANCES IN A FULL-SCALE DRINKING WATER TREATMENT PLANT IN THE VENETO REGION, ITALY

Bertanza, G., G.U. Capoferri, M. Carmagnani, F. Icarelli, S. Sorlini, and R. Pedrazzani.
Science of The Total Environment 734:139154(2020)

PFAS-contaminated groundwater in a ~ 200 km^2 area was treated at a drinking water treatment plant (flowrate = 30,000 m^3/d; 100,000 people served) equipped with granular activated carbon filters. Plant performance was measured by processing ~17,000 analytical data points over five years. PFBA was the first compound to attain breakthrough, followed by PFPeA, PFHxA, PFBS, and PFOA. The adsorption capacity and treated bed volumes at complete breakthrough ranged from 1.71 g/t and 7100 (PFBA) to 24.6 g/t and 50,900 (PFOA). The overall adsorption capacity was ~40 g of total PFAS/t. PFAS breakthrough behavior correlated with C-F chain length, the type of hydrophilic head, and the n-octanol/water partition coefficients logP and logD.

THE STORY ARC MODEL: REMEDIATING A GASOLINE-IMPACTED, DOWNSTREAM SITE IN CENTRAL ALBERTA

Lennox, B. | EnviroTech 2020, 11-12 June, Virtual Event, 2020

The story arc model, normally used as a literary device, was adapted to illustrate environmental site management and remediation activities, i.e., how gasoline impacts were identified through assessment and monitoring activities within a bedrock aquifer in a period of about 10 years. Results of these activities initiated a multi-stage remediation program that included installing and implementing a full-scale multi-phase extraction (MPE) system. After tailing system performance and attempts to optimize the system were unsuccessful, the MPE system was turned off, and on-site peroxide injections were completed. As of 2018, groundwater quality concentrations generally met risk management endpoints at off-lease oxidant injection wells, and pore water samples were less than surface water guidelines. In anticipation of remediation endpoints being met, natural attenuation parameters are being monitored to establish a long-term record of the degradation of hydrocarbons by naturally occurring microbes. *Longer abstract*: https://www.esaa.org/wp-content/uploads/2020/05/The-Story-Arc-Model.pdf
Presentation: https://www.esaa.org/wp-content/uploads/2020/06/ET2020-Lennox.pdf

IN SITU CHEMICAL REDUCTION FOR REMEDIATION OF SOIL CONTAINING CHLORINATED PESTICIDES AND HERBICIDES

Pare, J. | Smart Remediation, 11, March, Edmonton, Alberta, Canada, 2020

This presentation gives an overview of the chemistry involved in the in situ chemical reduction (ISCR) of organochlorine pesticides (or herbicides) using DARAMEND® ISCR reagents, followed by case studies and cost analyses from two completed applications. The keys to this remedial approach are the composition of the soil amendment and the application of repeated and sequential anoxic and then oxic conditions to the contaminated matrix. The patented (US Patent 6,083,394) products are composed of plant-fiber-based organic material and microscale elemental iron, which can be supplemented with sulfate in the form of alkaline earth salts. The soil amendment typically is applied at dosages of between 0.4% and 4% w/w, which cause very little increase in soil volume following treatment. https://2ziaphmm3zh1x23mj335vjxt-wpengine.netdna-ssl.com/wp-content/uploads/2019/10/SMART-Remediation-Calgary-2020-Jean-Pare.pdf

ENHANCED ANAEROBIC BIOREMEDIATION — CASE STUDIES

Riess, R. | Smart Remediation, 11, March, Edmonton, Alberta, Canada, 2020

Several recent case studies from Western Canada are discussed to demonstrate the types of sites and issues that can benefit from an anaerobic bioremediation approach. Case studies cover permeable reactive barriers installed to protect receptors and full site remediation. Although the cleanup timelines are generally longer than other alternatives, the approach can be very sustainable and cost-effective. https://2ziaphmm3zh1x23mj335vjxt-wpengine.netdna-ssl.com/wp-content/uploads/2019/10/SMART-Remediation-Calgary-2020-Ryan-Riess.pdf

Demonstrations / Feasibility Studies

STRATIGRAPHIC FLUX — A METHOD FOR DETERMINING PREFERENTIAL PATHWAYS FOR COMPLEX SITES

Curry, P.J., N.R.H. Welty, A.J. Yanites, C. Varley, and J.A. Quinnan.

Remediation 30(3):51-64(2020)

Funded by the U.S. Air Force, the Stratigraphic Flux approach was developed to provide a framework to understand contaminant transport pathways at complex sites and enable more reliable and cost-effective remediation. Stratigraphic Flux enables the development of quantitative, flux-based conceptual site models that are founded in sequence stratigraphy, and high-resolution hydraulic conductivity and contaminant distribution measurements. The article describes the Stratigraphic Flux framework, focusing on the key information needed and the methods of analysis. The approach was applied at a former chrome pit at Air Force Plant 4 in Fort Worth, TX to evaluate migration pathways for TCE and Cr. *See presentation from Battelle Bioremediation Symposium for more information on Stratigraphic Flux and the Air Force Plant 4 demonstration* https://www.battelle.org/docs/default-source/conference-proceedings/biosymposium/advanced-tools-for-assessing-bioremediation/c5_1440_-90_quinnan.pdf?sfvrsn=2 *See YouTube video on Stratigraphic Flux* https://www.youtube.com/watch?v=e2nXs4VJMF8

DETERMINATION OF SUITABLE TPH REMEDIATION APPROACH VIA MANOVA AND INFERENTIAL STATISTICS ASSESSMENT

Okonofua, E.S., J.O. Babatola, O.O. Ojuri, and K.H. Lasisi.
Remediation 30(3):75-87(2020)

A pilot study was conducted that used phytoremediation, land farming, or chemico-biological stabilization to treat petroleum hydrocarbon-(TPH) and PAH-contaminated soil at a crude oil site in Nigeria. Nine cells (three for each treatment) and subcells (to serve as a control) covering an area of 1.53 m^2 were prepared with ~300 kg of soil and. The prepared soil sample cells were delineated as low (spiked with 6.1 kg of crude oil), medium (spiked with 12.2 kg of crude oil), or high (spiked with 18.3 kg of crude oil) test plots. Each row contained a low, medium, and high concentration cell and was treated separately using one of the three treatment methods. The ratio of soil to organic amendment treatment was 2:1. Results showed >90% degradation in the initial concentration of TPH and PAHs across different contaminant levels except in the control subcells where only 30% of degradation was recorded. Land farming, chemico-biological stabilization, and phytoremediation ranked 1, 2, and 3, respectively.

LABORATORY AND FIELD INVESTIGATION OF SULFOLANE REMOVAL FROM WATER USING ACTIVATED CARBON

Yang, Y., L. Yu, S. Iranmanesh, and I. Keir.
Journal of Environmental Engineering 146(5) (2020)

Batch and fixed-bed adsorption experiments were conducted to evaluate the feasibility of using nine commercially-available activated carbons with different particle sizes and surface characteristics to remove sulfolane from aqueous media. Pilot-scale experiments also were conducted to assess the applicability of activated carbon adsorption under field conditions. Results indicated that coconut shell-based activated carbon had the highest sulfolane adsorption capacity. Adsorption was significantly affected by the presence of co-contaminants. The pilot study indicated that activated carbon can be used to remove sulfolane from groundwater.

ARSENIC IMMOBILIZATION BY IN-SITU IRON COATING FOR MANAGED AQUIFER REHABILITATION

Pi, K., X. Xie, T. Ma, C. Su, J. Li, and Y. Wang.
Water Research 181:115859(2020)

A pilot-scale study examined a managed aquifer rehabilitation (MAR) approach to remediate As-contaminated groundwater at the Datong Basin, northern China. Periodic injection of Fe2+ and ClO- solutions into the aquifer generated Fe-oxide coatings on sediment surfaces and prompted the buildup of weakly alkaline/circumneutral and oxidizing conditions to enhance As(III) oxidation. Dissolved As concentrations decreased from 78.0 µg/L to 9.8 µg/L over a 25-day amendment. The ~10 µg/L As level was maintained during a 215-day monitoring period. The technology may be applicable for As-affected aquifers with controlled oxidizing conditions in the Datong Basin and likely other high-As regions with similar hydrogeochemical settings.

A FIELD PILOT STUDY ON TREATING GROUNDWATER CONTAMINATED WITH SULFOLANE USING UV/ H_2O_2

Yu, L., S. Iranmanesh, I. Keir, and G. Achari.
Water 12(4):1200(2020)

A field pilot-scale ultraviolet (UV)/hydrogen peroxide (H_2O_2) system treated sulfolane-contaminated groundwater but was limited by the presence of iron and other groundwater. Different groundwater, as well as different operational parameters (e.g., influent sulfolane concentration, H_2O_2 dosage, and water flow rates) were studied. *This article is* ***Open Access*** *at* https://www.mdpi.com/2073-4441/12/4/1200

WATERLOO MEMBRANE SAMPLER: PASSIVE SAMPLING IN REMEDIATION PROJECTS; SOIL GAS, OUTDOOR AIR AND IMPLICATIONS FOR VAPOR INTRUSION STUDIES

Pautler, B. | Smart Remediation, 6 February, Ottawa, Ontario, Canada, 2020

The Waterloo Membrane Sampler™ (WMSTM) is a passive permeation sampler that incorporates a polydimethylsiloxane membrane across the face of a vial filled with sorbent medium. It has been used to collect soil gas, indoor, and outdoor air to monitor remediation projects focused on time-weighted average VOC concentration and compound-specific isotope analysis. This presentation provides technical information on the WMSTM sampler and data on recent sampler developments that show WMSTMs have the potential to be applied to all indoor and outdoor air VOC sampling, including perimeter monitoring of remediation projects, such as excavations and long-term monitoring for vapor intrusion work.
https://2ziaphmm3zh1x23mj335vjxt-wpengine.netdna-ssl.com/wp-content/uploads/2019/10/SMART-Remediation-Ottawa-2020-Brent-Pautler.pdf

Research

VALIDATION STUDIES ON ACTIVATED CARBON FIBER PASSIVE SAMPLER FOR PCDD/FS AND PCBS IN WATER

Cerasa, M., P. Benedetti, A. De Stefanis, E. Guerriero, S. Mosca, A. Bacaloni, and M. Rotatori.
Chemosphere 239:124666(2020)

A characterization and validation study was conducted on activated carbon filters (ACF) to monitor for PCBs, polychlorinated dibenzo-p-dioxins (PCDDs) and dibenzofurans (PCDFs) in water. The filters were characterized as having a specific surface area of ~2500 m^2/g, which consisted of a homogeneous microporosity distribution and had balanced basic and acidic surface functional groups. The validity of using the ACF as solid-phase extraction and as passive sampler was evaluated by the percentage recovery (R %) of $^{13}C_{12}$-labeled standards of PCDD/Fs and PCBs added in a known volume of water. When compared to the R% of liquid-liquid extraction, the authors suggest the method has a better reproducibility of results and is capable of satisfying the extraction requirements of EPA reference methods.

DEVELOPMENT OF A NOVEL EQUILIBRIUM PASSIVE SAMPLING DEVICE FOR METHYLMERCURY IN SEDIMENT AND SOIL POREWATERS

Sanders, J.P., A. McBurney, C.C. Gilmour, G.E. Schwartz, S. Washburn, S.B.K. Driscoll, et al.
Environmental Toxicology and Chemistry 39(2):323-334(2020)

An equilibrium passive sampler was developed to predict the concentration of the chemically labile fraction of MeHg in sediment porewaters based on equilibrium partitioning into the sampler, without modeling diffusion rates through the sampler material. Candidate materials tested included a range of polymers embedded with suitable sorbents for MeHg. One of the most promising was activated carbon (AC) embedded in agarose. Sampler equilibration time in sediments was ~1-2 weeks. AC exhibited relatively rapid desorption of Hg and MeHg, indicating that it is capable of reversible, equilibrium measurements. In sediment:water microcosms, porewater concentrations made with isotherm-calibrated passive samplers agreed within a factor of 2 (unamended sediment) or 4 (AC-amended sediment) with directly measured concentrations.

COAGULANT-ENHANCED SORPTION FOR IN SITU REMEDIATION OF PFAS-IMPACTED GROUNDWATER SYSTEMS

Simcik, M., W.A. Arnold, and K. Pennell. SERDP Project ER-2425, 19 pp, 2019

The main objective of this project was to develop a cost-effective, in situ method using commercially available drinking water coagulants as sorption enhancers to sequester PFOS, PFOA, PFNA, PFHxS, PFHpA, and PFBS in groundwater systems to prevent migration to drinking water supplies. The central hypothesis was that the addition of chemical coagulants used in the drinking water industry and other water treatment applications would enhance PFAS sorption to the soil, reducing PFAS mobility in the subsurface over long periods. Results of batch tests using excavated aquifer material indicated that both polydimethylamine diallyldimethyl ammonium chloride and polyamine were successful at increasing the sorption of PFAS for retention by the aquifer material. https://www.serdp-estcp.org/content/download/51375/505520/file/ER-2425%20Executive%20Summary.pdf

A FRAMEWORK FOR ASSESSING BIOACCUMULATION AND EXPOSURE RISKS OF PER- AND POLYFLUOROALKYL SUBSTANCES IN THREATENED AND ENDANGERED SPECIES ON AQUEOUS FILM FORMING FOAM (AFFF)-IMPACTED SITES

Gobas, F. SERDP Project ER18-1502, 17 pp, 2020

The study involved providing a comprehensive literature review of physical-chemical properties, bioaccumulation metrics, and environmental concentrations; developing a risk assessment framework for assessing PFAS bioaccumulation and exposure risks in T&E species at AFFF-impacted DoD sites; and applying the proposed framework to several DoD sites where existing PFAS monitoring data are available. The results will help guide future research efforts and risk assessment initiatives related to exposure of legacy PFASs in T&E species at AFFF-impacted DoD sites. https://www.serdp-estcp.org/content/download/51374/505510/file/ER18-1502%20Executive%20Summary.pdf

A COMBINED PHOTO/ELECTROCHEMICAL REDUCTIVE PATHWAY TOWARDS ENHANCED PFAS DEGRADATION

Jassby, D., D. Cwiertny, and B. Wong. SERDP Project ER18-1595, 29 pp, 2020

This project examined how potential-induced electron transfer (ET) processes can dramatically increase the defluorination rate of PFOS molecules by UV-generated h_e in an additive-free system. Results demonstrated how the specific adsorption of PFOS onto electrodes with tailored chemical properties could facilitate ET between the electrode and the adsorbed PFOS, which enables UV-generated h_e to rapidly defluorinate PFOS. The study was extended to investigate the effect of the head group and alkyl chain length on the extent of PFAS degradation, and on other co-contaminants, including chlorinated solvents such as TCE and *cis*-DCE. https://www.serdp-estcp.org/content/download/51376/505530/file/ER18-1595%20Final%20Report.pdf

PILOT SCALE ASSESSMENT OF A DEPLOYABLE PHOTOCATALYTIC TREATMENT SYSTEM MODIFIED WITH BIPO4 CATALYST PARTICLES FOR PFAS DESTRUCTION IN INVESTIGATION-DERIVED WASTEWATERS

Cates, E. SERDP Project ER18-1599, 40 pp, 2020

The objectives of this limited scope project were to assess the capabilities of the $Bi_3O(OH)(PO_4)^2$ microparticles/ultraviolet (BOHP/UV) photocatalytic advanced oxidation process for a wide range of PFAS contaminants relevant to investigation derived waste, identify important complex water matrix considerations and quenching species, and demonstrate catalyst performance upon incorporation into a deployable commercial photoreactor system. The demonstrated performance of the processes represents significant progress toward actualizing a comprehensive field-deployable system. https://www.serdp-estcp.org/content/download/51273/504706/file/ER18-1599%20Final%20Report.pdf

THERMAL DESORPTION AS A HIGH REMOVAL REMEDIATION TECHNIQUE FOR SOILS CONTAMINATED WITH PER- AND POLYFLUOROALKYL SUBSTANCES (PFASS)

Sorengard, M., A-S. Lindh, and L. Ahrens. | PLoS ONE 15(6):e0234476(2020)

Two fortified soils (Σ_9PFAS≈4 mg/kg) and one field-contaminated soil (Σ_9PFAS≈0.025 mg/kg) were thermally treated for 75 minutes at temperatures ranging from 150-550°C. At 350°C, Σ_9PFAS soil concentrations decreased by an average of 43% (fortified soils) and 79% (field-contaminated soils). At 450°C, >99% of PFAS were removed from the fortified soils, while at 550°C the fraction removed ranged between 71 and 99% for the field-contaminated soil. In the field-contaminated soil, PFAS classes with functional groups of sulfonates (PFSAs) and

sulfonamides (FOSAs) showed higher removal than PFCAs. While thermal desorption has the potential to remove a wide variety of PFASs from soil, more studies are needed to investigate the cost-effectiveness, creation of transformation products, and air-phase vacuum filtration techniques.
https://journals.plos.org/plosone/article/file?id=10.1371/journal.pone.0234476&type=printable

IDENTIFICATION OF A CHLORODIBENZO-P-DIOXIN DECHLORINATING *DEHALOCOCCOIDES MCCARTYI* BY STABLE ISOTOPE PROBING

Dam, H.T., W. Sun, L. McGuinness, L.J. Kerkhof, and M.M. Haeggblom.
Environmental Science & Technology 53(24):14409-14419(2019)

A DNA-stable isotope probing (SIP) approach identified bacteria active in dechlorinating PCDDs in river sediments using 1,2,3,4-tetrachlorodibenzo-p-dioxin (1,2,3,4-TeCDD) as a model. Pyrosequencing of reverse-transcribed 16S rRNA of TeCDD dechlorinating enrichment cultures was used to reveal active members of the bacterial community. Analysis of bacterial community profiles of ^{13}C labeled heavy DNA fraction revealed that an operational taxonomic unit corresponding to *Dehalococcoides mccartyi* accounted for a significantly greater abundance in cultures amended with 1,2,3,4-TeCDD than in unamended cultures. Results imply that the *D. mccartyi* strain is involved in 1,2,3,4-TeCDD reductive dechlorination and suggests that SIP can assess the bioremediation potential of organohalogen contaminated sites.

2,3,7,8-TETRACHLORODIBENZO-P-DIOXIN DECHLORINATION IS DIFFERENTIALLY ENHANCED BY DICHLOROBENZENE AMENDMENT IN PASSAIC RIVER, NJ SEDIMENTS

Dean, R.K., C.R. Schneider, H.S. Almnehlawi, K.S. Dawson, and D.E. Fennell.
Environmental Science & Technology [Published online 20 May 2020 prior to print]

Bacteria from sediments of the Passaic River were enriched on TCE and 1,2-DCB and used, along with original unamended sediment, as inocula to dechlorinate 2,3,7,8-tetrachlorodibenzo- *p*-dioxin (2,3,7,8-TeCDD), 1,2,3,4-TeCDD, and 2,7-dichlorodibenzo-p-dioxin (2,7-DiCDD). All inocula dechlorinated 1,2,3,4-TeCDD to different extents, which was more rapid than the other amended congeners. Progressive dechlorination of 2,3,7,8-TeCDD was observed in bottles inoculated with the DCB enrichment culture, and dechlorination of 2,7-DiCDD was observed almost exclusively in bottles inoculated with unamended river sediment. Phylotypes within the *Dehalococcoidia* class were differentially enriched in DCB versus TCE cultures, indicating that they may play a role in polychlorinated dibenzo-*p*-dioxins dechlorination.

General News

REMEDIATION OF SOIL AND GROUNDWATER CONTAMINATED WITH ORGANIC CHEMICALS USING STABILIZED NANOPARTICLES: LESSONS FROM THE PAST TWO DECADES

Cai Z., X. Zhao, J. Duan, D. Zhao, Z. Dang, and Z. Lin.
Frontiers of Environmental Science & Engineering 14(5):84(2020)

This article overviews the fundamental principles on particle stabilization and the evolution and some recent developments of stabilized nanoparticles for degradation of organic contaminants in soil and groundwater https://link.springer.com/content/pdf/10.1007/s11783-020-1263-8.pdf

MODELING PILOT-SCALE GAC PFAS ADSORPTION FOR THE SIMULATION OF FULL-SCALE PERFORMANCE AND COSTS

Burkhardt, J., C. Vandermeyden, N. Burns, D. Mobley, C. Patterson, R. Khera, et al.
AWWA Water Quality Technology Conference, 3-7 November, Dallas, TX, 2019

This presentation discusses modeling PFAS removal with granular activated carbon and other resources associated with PFAS removal from drinking water. The presentation specifically discusses the process of extending pilot data into full-scale predictions of bed replacement frequency and costing efforts as well as information associated with the treatability database. *Download the presentation at* https://cfpub.epa.gov/si/si_public_record_report.cfm?Lab=CESER&dirEntryId=348070 *See EPA's webpage for available PFAS Data and Tools* https://www.epa.gov/pfas/epa-pfas-data-and-tools

SUBSOIL SALINITY TOOL (SST)

Huber, G. and A. Knafla. | EnviroTech 2020, 11-12 June, Virtual Event, 2020

The new Version 3.0 update to the SST incorporates a variety of new algorithms, each of which further refines and optimizes the guidelines generated for important chloride-related receptors and pathways. This presentation discusses these updated algorithms, and how they help to produce more robust guidelines with frequently lower remediation volumes compared to the previous Version 2.5.3 of the SST. *Longer abstract:* https://www.esaa.org/wp-content/uploads/2020/05/Subsoil-Salinity-Tool-SST-Version-3.pdf *Presentation:* https://www.esaa.org/wp-content/uploads/2020/06/ET2020-Huber.pdf *The SST is available at* https://open.alberta.ca/publications/contaminated-sites-management-subsoil-salinity-tool

ENGINEERING ISSUE: SOIL VAPOR EXTRACTION (SVE) TECHNOLOGY

EPA Office of Research and Development, EPA/600/R-18/053, 76 pp, 2018

This Engineering Issue Paper assembles, organizes, and summarizes the current knowledge on soil vapor extraction (SVE) technologies that are available for removing VOCs from unsaturated soils above the water table. As a technical support document, it describes SVE technologies with a focus on remedial scoping needs, but it does not represent EPA policy or guidance. https://cfpub.epa.gov/si/si_public_record_report.cfm?Lab=NRMRL&dirEntryId=345171

VAPOR INTRUSION INVESTIGATIONS AND DECISION-MAKING: A CRITICAL REVIEW

Ma, J., T. McHugh, L. Beckley, M. Lahvis, G. DeVaull, and L. Jiang.
Environmental Science & Technology 54(12):7050-7069(2020)

Key elements important to vapor intrusion (VI) site characterization, the status and current understanding, and data interpretation challenges, as well as innovative tools developed to help overcome the challenges, are highlighted in this review. While significant advances in the understanding of VI in the past 20 years have occurred, limitations and knowledge gaps in screening, investigation methods, and modeling approaches still exist. Potential areas for further research include improved initial screening methods that account for the site-specific role of barriers, improved understanding of preferential pathways, and systematic study of buildings and infrastructure other than single-family residences.

LEADING EDGES IN BIOREMEDIATION TECHNOLOGIES FOR REMOVAL OF PETROLEUM HYDROCARBONS

Naeem, U. and M.A. Qazi.
Environmental Science and Pollution Research [Published online 8 August 2019 prior to print]

A series of sustainable solutions are provided for petroleum hydrocarbon degradation without exploiting the environment and with the opportunity to reuse treated media. Most recent in situ and ex situ application methods of petroleum hydrocarbon bioremediation are also reported. A need exists to explore different cost-effective biotechnological resources to degrade petroleum hydrocarbon by screening novel microbial strains or creating genetically-engineered bacteria to survive in a harsh environment.

TRAC TRENDS IN ANALYTICAL CHEMISTRY

Special Section on Perfluoroalkyl Substances, Barcelo, D. and T. Ruan (eds), Vol 121, Dec 2019

Twelve review articles comprise the "Analysis of Perfluoroalkyl Substances in the Environment and Human Health Samples" special section. They provide snapshots of current progress on analytical solutions for the traditional PFAS pollutants and emerging alternatives and discuss knowledge gaps and future perspectives. Topics include fluorine speciation, traditional, and emerging PFAS compounds; state-of-the-art methodologies including passive sampling protocols for air and water; optimized pretreatments for various matrices; PFAS-featured nontarget identification; and data evaluation based on the progressive global interlaboratory assessments. *To see a list of the articles in the special section, see* https://www.sciencedirect.com/journal/trac-trends-in-analytical-chemistry/special-issue/103ZBTSPZD1.

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