# Technology Innovation News Survey

## *Entries for June 1-15, 2018*

### Market/Commercialization Information

#### CLEANUP HEXAVALENT CHROMIUM CONTAMINATION

Department of the Army, Army Contracting Command, MICC - Fort Drum, NY.
Federal Business Opportunities, FBO-5977, Solicitation W911S2-18-U-3616, 2018

This acquisition is set aside 100% for HUBZone small business concerns under NAICS Code 562910, size standard 750. The contractor shall furnish all labor, equipment, and material to clean surfaces contaminated with dust containing hexavalent chromium [Cr(VI)] at the P-2072 aviation hangar located on Wheeler-Sack Army Airfield. Wipe sampling performed by Fort Drum Industrial Hygiene indicates the dust on horizontal surfaces in the facility may contain levels of Cr(VI) ranging from below detectable levels to 6.96 µg/100 cm². Ambient levels of airborne Cr(VI) were found to be within the OSHA Permissible Exposure Level of 5 µg/m³. Areas to be cleaned (measurements are approximate) include 96,000 ft² of aviation hangar bay surfaces and 25,920 ft² of administrative office space, stairwells (both ends of the building), and first-floor hallway surfaces. A site visit will be conducted July 20, 2018, at 9:00 AM ET. Offers must be received by 2:00 PM ET on July 31, 2018. https://www.fbo.gov/notices/9cd893b9827d9eda81a1e155b1add611

#### REMEDIATION OF ABANDONED MINING FEATURES, NEW MEXICO REGION

Bureau of Land Management (BLM), New Mexico Region, Las Cruces, NM.
Federal Business Opportunities, FBO-5954, Solicitation 140L3018Q0012, 2018

This solicitation supports remediation of three abandoned mining features located in the New Mexico region: (1) New Lancers Mining District; (2) Lemitar, Socorro West, Magdelena; and (3) Hansonburg. BLM prefers a single award for all three projects, but the agency may consider independent awards in support of compressed schedule completions. Offerors should quote each project independently and consider batching all three projects for collective cost considerations. Estimated project/contract performance period is not to exceed one year from award date. The details of this procurement are posted only on FedConnect at https://www.fedconnect.net/FedConnect/?doc=140L3018Q0012&agency=DOI [Note: It might be necessary to copy and paste the URL into your browser for direct access]. The NAICS code is 562910. Site surveys are scheduled July 17 and 18. Offers must be received no later than 2:00 PM ET on August 1, 2018. Although issued originally as a full and open procurement, the solicitation was modified to partial small business; however, failure to attain the desired performance objective shall result in re-solicitation open market.

#### WASHINGTON COUNTY OLDMINES/POTOS/FURNACE CREEK NPL SITES LEAD REMEDIATION ACTION

Environmental Protection Agency, Region VII, Lenexa, KS.
Federal Business Opportunities, FBO-5913, Solicitation 68HE0718R0014, 2018

U.S. EPA Region 7 seeks the services of an experienced firm to provide remedial action for lead-contaminated properties within Operable Unit 1 at the Washington County Lead District Old Mines, Potosi, and Furnace Creek Superfund Sites, which collectively are referred to as OldMines/Potos/Furnace Creek NPL Sites Residential Properties in Washington County, Missouri. Offers are due by 8:00 AM CT on August 6, 2018. Monitor FedConnect for updates at https://www.fedconnect.net/FedConnect/?doc=68HE0718R0014&agency=EPA [Note: It might be necessary to copy and paste the URL into your browser for direct access.]

#### BROOKHAVEN NATIONAL LABORATORY STACK DEMOLITION

U.S. DOE, Environmental Management Consolidated Business, Cincinnati, OH.
Federal Business Opportunities, FBO-5975, Solicitation 89303318REM000028, 2018

DOE's Office of Environmental Management is currently in the acquisition planning stage for demolition, decommissioning, and site clearance of the High Flux Beam Reactor (HFBR) and related buildings at the Brookhaven National Laboratory facility on Long Island, NY. DOE seeks to demolish the HFBR stack in a single effort. The decommissioning activities include isolation of utilities (e.g., electrical service), demolition and removal of the stack to 2 feet below grade, excavation of radiologically contaminated soils, final status survey, independent verification survey, packaging and staging of an estimated ~1,951 yd³ of waste, and restoration of the affected site. This project would be a new requirement and there is no incumbent contractor. The NAICS code for this requirement is expected to be 562910 (Environmental Remediation Services), small business size standard 750. The estimated period of performance is June 1, 2019 to Sept. 30, 2020. This notice solicits input via capability statements and comments from interested parties (including small business concerns) with the specialized capabilities necessary to perform all or part of the requirements defined in the attachments posted on FedConnect at https://www.fedconnect.net/FedConnect/?doc=89303318REM000028&agency=DOE [Note: It might be necessary to copy and paste the URL into your browser for direct access]. Capability statements must be received via email to the POC by 11:59 PM ET on August 6, 2018.

#### IDIQ CONTRACT FOR ECONOMICALLY DISADVANTAGED WOMAN-OWNED SMALL BUSINESS A/E ENVIRONMENTAL SERVICES

Department of the Army, U.S. Army Corps of Engineers, USACE District, Louisville, KY.
Federal Business Opportunities, FBO-5978, Solicitation W912QR18R0055, 2018

This notice constitutes a request for submittal of SF330 packages and is open only to economically disadvantaged woman-owned small businesses under NAICS code 541330. The proposed A/E services, which will be obtained by a negotiated firm-fixed-price contract, are for environmental support projects primarily within the Great Lakes and Ohio River Division mission boundaries. Professional services are needed to support military and civil environmental programs for the Defense Services and other federal agencies. Firms must be capable of performing work on a wide variety of hazardous, toxic, and radiological sites in addition to other environmental sites in a manner that complies with federal, state, and local regulations and laws, and within timeframes required. One contract will be awarded and administered by the Louisville District for a 5-year period of performance with a maximum cumulative contract value of $4M. The estimated start date is November 2018. All SF330 packages must be received by 2:00 PM ET on Tuesday, August 14, 2018. https://www.fbo.gov/spg/USA/COE/DACA27/W912QR18R0055/listing.html

### Cleanup News

#### RAB MEETING MINUTES: FORMER GALENA FORWARD OPERATING LOCATION, ALASKA

Galena Restoration Advisory Board, 34 pp, 25 Oct 2017

The performance-based remediation contract for the Former Galena Forward Operating Location encompasses the cleanup of 32 sites. Five sites have been closed to date. Installation of remedial systems began in 2015 and will continue until 2018. Under the contract operation of the remedial systems will continue through the summer of 2020. Remedies installed in 2017 included two horizontal well air sparge systems, soil vapor extraction systems to remove TCE at Site SS015 in addition to several other sites, sulfate injections in multiple areas to enhance biodegradation of deeper fuel contamination in saturated soil, bioventing for Site FT001, and enhanced anaerobic bioremediation injections for dissolved-phase TCE at two sites. See **PDF pages 13-24** for slides that illustrate these systems.
http://www.afcec.af.mil/Portals/17/documents/BRAC/Galena/Galena%2025%20Oct%202017%20RAB%20Meeting%20Minutes_Final.pdf?ver=2017-12-04-111007-573

#### REMEDIATION AND CONSTRUCTION COMPLETION REPORT — CLUSTER 6, FORMER KAST PROPERTY, CARSON, CALIFORNIA

California Regional Water Quality Control Board, Los Angeles Region. 1676 pp, 2018

This report documents remediation and restoration activities for Cluster 6 of the former Kast Property, which is now the Carousel housing tract in Carson, California. Remedial activities included excavation and off-site disposal of petroleum hydrocarbon-impacted soil to a depth of 5 ft bgs at five residential properties and further excavation to a maximum depth of 10 ft at two targeted locations; installation of optional sub-slab depressurization (SSD) systems at six properties; soil vapor extraction (SVE)/bioventing well and piping installation at six properties; and SVE header piping and well installation within Ravenna and Panama Avenues. Site preparation activities began on October 30, 2017, and restoration activities were generally complete by March 26, 2018. About 5,770 tons of impacted soil were excavated from the Cluster 6 properties and transported either as nonhazardous waste for disposal in the Chiquita Canyon Landfill in Castaic, California, or to the Soil Safe treatment facility in Adelanto, California, for thermal treatment and recycling. Following soil excavation and backfill activities, the SSD systems and SVE/bioventing wells and piping were installed. An additional ~792 tons of soil were excavated from the SVE header piping trenches within Ravenna and Panama Avenues and transported off site for disposal as nonhazardous waste. *See this report and other technical information on this project at* http://geotracker.waterboards.ca.gov/profile_report?global_id=T10000000228.

### Demonstrations / Feasibility Studies

#### IN SITU BIOREMEDIATION OF A GASOLINE-CONTAMINATED VADOSE ZONE: IMPLICATIONS FROM DIRECT OBSERVATIONS

Moshkovich, E., Z. Ronen, F. Gelman, and O. Dahan.
Vadose Zone Journal 17(1):(2018)

Enhanced biostimulation of indigenous bacteria through infiltration of nutrient- and $O_2$-amended water in a gasoline-contaminated deep vadose zone was observed at a gas station affected by underground storage tank leakage in the city of Tel Aviv, Israel. A vadose zone monitoring system (VMS) provided real-time observations of the treatment process's effect on hydrocarbon attenuation. The VMS data included continuous measurements of variations in water content, concentrations and isotopic compositions of MTBE and BTEX in pore-water and gas phases, and concentrations of $O_2$ and $CO_2$ in the vadose zone gas phase. Real-time observations from the unsaturated zone enabled interactive adjustment of the remediation strategy and improved biostimulation conditions for biodegradation of the target compounds. In the course of three infiltration events of an $O_2$- and nutrient-enriched water solution, a significant reduction in contaminant mass was observed across the unsaturated zone. *This paper is* ***Open Access*** *at* https://dl.sciencesocieties.org/publications/vzj/abstracts/17/1/170153.

#### BIOSPARGING PILOT STUDY: TECHNICAL MEMORANDUM

Hartland Township, 341 pp, 2017

A biosparging pilot study was conducted at the Hartland 36 Gas Plant, a former natural gas processing plant that operated from 1999 to 2015 in Hartland Township, Livingston County, Michigan. The pilot's purpose was to evaluate the effectiveness of biosparging to enhance bioremediation of sulfolane dissolved in the groundwater and ultimately to provide data for use in full-scale remediation system design. This technical memorandum summarizes the field methodologies and results demonstrating the effectiveness of the biosparging pilot study.
http://hartlandtwp.com/wp-content/uploads/2017/07/Hartland-36-Gas-Plant-Biosparging-Pilot-Study-Technical-Memorandum_7-28-2017-002.pdf
According to information found in follow-on reports at the bottom of http://hartlandtwp.com/residents/roads-water-sewer/water/, startup of a full-scale biosparging remediation system was implemented on November 16, 2017.

#### TECHNICAL MEMORANDUM: SVE SYSTEM OPERATION UPDATE, MULLINS RUBBER PRODUCTS

U.S. EPA Region 5, 32 pp, 2018

The Valley Pike VOCs site, located in Riverside, Ohio, is a mixed industrial and residential site where groundwater contaminated with PCE and TCE was discovered in 2013. The site was added to the National Priorities List on September 9, 2016. U.S. EPA is coordinating with the Ohio EPA to oversee investigations and responses to the contamination at the site by Mullins Rubber Products Inc. in accordance with a 2016 administrative order on consent. As part of the 2016 agreement, Mullins implemented a pilot-scale soil vapor extraction (SVE) system aimed at reducing soil contaminants that affect the groundwater and produce soil gas that in some instances is rising as vapors into residential and commercial structures. Pilot test activities were completed in March 2016. The SVE system remains in continuous operation following completion of the pilot test to address residual source-area VOCs while full-scale SVE system design and installation is undertaken. The pilot system was expanded to include two additional recovery wells in January 2017. The SVE system has recovered over 574 lbs of VOCs.
http://semspub.epa.gov/src/document/05/940487 For more details, see the 2016 *Full Scale Soil Vapor Extraction System Design and Work Plan* at

http://semspub.epa.gov/src/document/05/935048

### PILOT TESTING OF ELECTROKINETIC REMEDIATION TO FACILITATE NITRATE-ENHANCED BIOREMEDIATION OF GASOLINE CONTAMINATION IN A CLAY AQUITARD

Brow, C.
British Columbia Environment Industry Association: BEST 2018, 28 slides, 2018

An electrokinetic remediation pilot test was conducted at the location of a former retail gasoline station in British Columbia, Canada, to assess the feasibility of using an electric field to facilitate the transport of nitrate as a bioremediation amendment within a silty clay aquitard. Within the 100 m² pilot area, eight electrodes were installed in two rows of four. Each electrode was constructed so it could operate as either an anode or cathode. Injection wells and monitoring wells were installed between the electrodes. The injection solution contained a mixture of ammonium nitrate, a biodegradable surfactant, and rhodamine dye. During the 7-week injection period, a constant unidirectional electric field was developed by operating one row of electrodes as cathodes and the other as anodes. Injection rates by gravity averaged 23 and 165 L/d for 1.5-in and 4-in wells, respectively, and increased to 450 and 1,320 L/d with pumping. About 14,000 L of water were extracted at the cathodes during the test, with no evidence of clay consolidation or need to inject additional water at the anodes. From the 4-in injection wells, the estimated migration rate toward the anode was 4.1 cm/d, whereas flow to the cathode and cross-field migration rates were ~1.2 cm/d. Nitrate migration rates were almost 3.5 times greater in the direction of the electric field; however, the pilot's economics suggest that the magnitude of enhancement at the site was not enough to be cost-effective. **Slides:** http://bceia.com/best/wp-content/uploads/2018/05/Brow-1.pdf

### ENUBIODECHLOR XL™: REMEDIATION SOLVENT FOR CHLORINATED SOLVENT CONTAMINATED SITES

Sustainable Development Technology Canada Annual Report Supplement — 2016/2017, p 27, 2017

Sustainable Development Technology Canada funding is focused on the development and demonstration of new technologies, such as EnuBioDechlor XL™ (Produits Enuchem Inc.), a remediation product. EnuBioDechlor XL is a liquid that consists of emulsified saponified soybean oil with iron powder. The compound is injected in situ and together with bacteria to convert chlorinated solvents in subsurface environments into ethylene and chloride ions. PCE and TCE are two of the main contaminants targeted by this technology. Demonstrations of product performance were conducted in five contaminated sites: one chemical industry site and four dry cleaning facilities. EnuBioDechlor XL was injected in all sites without excavation. A first and second site in St. Constant and St. Henry were completely remediated during the project. A third and fourth site in Bedford and St. Jean were partially remediated because the project time frame was insufficient to show complete remediation, although treatment effects reportedly continued after project completion. The fifth site in St. Sauveur successfully demonstrated the technology as a permeable reactive barrier to contain contaminant migration in the groundwater. https://www.sdtc.ca/en/about-sdtc/reports

## Research

### TREATMENT OF PERFLUORINATED ALKYL SUBSTANCES IN WASH WATER USING GRANULAR ACTIVATED CARBON AND MIXED-MEDIA

Szabo, J., J. Hall, M. Magnuson, S. Panguluri, and G. Meiners.
EPA 600-R-17-175, 44 pp, 2017

This report summarizes the results from testing conducted to evaluate the treatment of large volumes of water containing perfluorinated alkyl substances (PFASs), specifically treatment for water contaminated by aqueous film forming foam (AFFF) used in firefighting. The AFFF selected for this study was a product widely used historically, and it contained PFOA and PFOS. Treatment of the AFFF-contaminated water was investigated using Calgon Filtrasorb® 600 granular activated carbon (GAC) and Ziltek RemBind™ mixed media. The contaminated water was pumped through treatment media and then emptied into bladder tanks. The goal was to assess the respective performance of the two products to reduce the PFAS concentration before disposal of the water (e.g., in a sewer). https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=P100UJIG.txt

### SORBENT AMENDMENT AS A REMEDIATION STRATEGY TO REDUCE PFAS MOBILITY AND LEACHING IN A CONTAMINATED SANDY SOIL FROM A NORWEGIAN FIREFIGHTING TRAINING FACILITY

Hale, S.E., H.P.H. Arp, G.A. Slinde, E.J. Wade, K. Bjorseth, G.D. Breedveld, B.F. Straith, et al.
Chemosphere 171:9-18(2017)

Soils were sampled from a firefighting training facility at a Norwegian airport, and total and leachable concentrations of poly- and perfluoroalkyl substances (PFASs) were quantified. PFOS was the most dominant PFAS present in all soil samples (9-2600 µg/kg). PFOS concentrations measured in leachate water ranged 1.2-212 µg/L. Different sorbents were added to the sampled soils to evaluate respective performance in reducing PFAS mobility and leaching to groundwater. Upon addition of sorbent amendment (3%), activated carbon reduced leaching by 94-99.9%, compost soil reduced leaching by 29-34%, and montmorillonite reduced leading by 28-40%. See additional information in 16 presentation slides: https://www.mn.uio.no/kjemi/english/research/projects/ICCE2017/wednesday-21.06/helga-eng-auditorium-1/hr.-10.30/1200-ase-hoiseter-icce-2017.pdf

### SORPTION OF PERFLUOROALKYL AND POLYFLUOROALKYL SUBSTANCES (PFASs) BY NATURAL AND ANTHROPOGENIC CARBONACEOUS SORBENTS

Zhi, Yue, Ph.D. dissertation, McGill University, Montreal, Quebec, Canada. 215 pp, 2017

Initially, interactions between commercial adsorbents with PFOA and PFOS were examined to investigate ways in which water treatment efficiency for PFASs might be improved. The study assessed (1) the sorption of PFOS and PFOA onto as-received and surface-modified carbonaceous adsorbents using single-solute batch sorption experiments and (2) identified the main carbon characteristics controlling PFAS uptake. Adsorbent surface chemistry played a greater role in controlling the extent of uptake than physical properties. High carbon surface basicity was closely linked to high PFOS and PFOA affinity. Prior to any modification of the carbon materials, synthetic polymer-based Ambersorb and activated carbon fibers were the most effective adsorbents. Surface modification, more so with ammonia gas treatment than with high-temperature thermal treatment, greatly improved sorption of PFOS and PFOA by wood-based carbons and activated carbon fibers. The research then focused on the role played by soil organic matter and pyrogenic carbonaceous materials in determining the transport potential of a range of perfluoroalkyl acids and their chemical precursors. http://digitool.library.mcgill.ca/R/-?func=dbin-jump-full&current_base=GEN01&object_id=148488

### APPLYING SHORT-DURATION PULSES AS A MEAN TO ENHANCE VOLATILE ORGANIC COMPOUNDS REMOVAL BY AIR SPARGING

Neriah, A.B. and A. Paster.
Journal of Contaminant Hydrology 205:96-106(2017)

Application of short-duration pulses of high air pressure to an air sparging system for groundwater remediation was tested in a 2D lab setup to test the hypothesis that this "boxcar" injection mode could enhance remediation efficiency due to the larger zone of influence and enhanced mixing resulting from the pressure pulses. Results confirmed that cyclically applying short-duration pressure pulses could enhance contaminant cleanup. Comparing boxcar to conventional continuous air injection showed up to a 3-fold increase in the single-well radius of influence, dependent on the intensity of the short-duration pressure pulses. Toluene removal efficiency from water was 95% higher than the removal achieved under continuous injection with the same average conditions. Application of boxcar mode in an existing multiwell sparging setup can be accomplished via the installation of an on-off valve in each of the injection wells and a central control system. Turning off some of the wells for a short period results in a stepwise increase in injection pressure in the rest of the wells. *See additional information* at http://www.eng.tau.ac.il/~paster/AsafResearch.html

### USE OF SOIL AMENDMENTS TO IMMOBILIZE ANTIMONY AND LEAD IN MODERATELY CONTAMINATED SHOOTING RANGE SOILS

Tandy, S., N. Meier, and R. Schulin.
Journal of Hazardous Materials 324(Pt B):617-625(2017)

Finding the right stabilization treatment for Pb and Sb in shooting range soils can be challenging because under oxidized conditions, Pb is a cation and Sb an anion, and they often show opposite mobility in soil upon application of amendments. A batch experiment was set up with two soils (slightly acidic and alkaline) and two red mud-based amendments (ViroSoil™ 1 and 2), alone and in combination with two reducing agents (zero-valent iron and iron sulfate), to assess the effect of the treatments on metal(loid) leaching and compare it to unamended soil and soil amended with goethite, a known Sb adsorbent. Fe sulfate was effective at reducing Sb leaching due to the reduction of Sb(V) to Sb(III), which bound more strongly to iron (hydr)oxides in soil, but Fe sulfate had an adverse effect on the leaching of Pb due to its acidifying effect and reductive Mn (hyd)roxides. Combining ViroSoil amendments with Fe sulfate reduced leaching by both Sb and Pb and proved a suitable in situ chemical stabilization treatment.

### USING THE NATURAL BIODEGRADATION POTENTIAL OF SHALLOW SOILS FOR IN-SITU REMEDIATION OF DEEP VADOSE ZONE AND GROUNDWATER

Avishai, L., H. Siebner, O. Dahan, and Z. Ronen.
Journal of Hazardous Materials 324(Pt B):398-405(2017)

The capacity of topsoil to serve as a bioreactor for perchlorate degradation was investigated by infiltrating polluted groundwater under unsaturated conditions in column experiments designed to simulate typical remediation operation of daily wetting and draining cycles of contaminated water amended with an electron donor. Covering the infiltration area with bentonite ensured anaerobic conditions. The soil remained unsaturated, and redox potential dropped to < -200 mV. Perchlorate was reduced continuously from ~1150 mg/L at the inlet to ~300 mg/L at the outlet in daily cycles, with removal efficiency between 60-84%. No signs of bioclogging were observed during the 3-month operation although occasional iron reduction was observed due to excess electron donor. Changes in perchlorate-reducing bacteria numbers were inferred from an increase in *pcrA* gene abundances from ~$10^5$-$10^7$ copied per gram at the end of the experiment, indicating the growth of perchlorate-reducing bacteria.

### ENHANCED BIOLOGICAL STABILIZATION OF HEAVY METALS IN SEDIMENT USING IMMOBILIZED SULFATE REDUCING BACTERIA BEADS WITH INNER COHESIVE NUTRIENT

Li, X., L. Dai, C. Zhang, G. Zeng, Y. Liu, C. Zhou, W. Xu, Y. Wu, X. Tang, W. Liu, and S. Lan.
Journal of Hazardous Materials 324(Pt B):340-347(2017)

A series of experiments was conducted for treating heavy metal-contaminated sediments sampled from the Xiangjiang River. The treatment combined sulfate-reducing bacteria (SRB) immobilized within beads of polyvinyl alcohol. Sodium lactate provided an inner cohesive nutrient. The activity of the SRB within the porous structure and its huge specific surface area provided a convenient channel for fluid movement while protecting the cells against metal toxicity. Lower leaching toxicity and removal efficiencies of 76.3% Cu, 95.6% Zn, 100% Pb, and 91.2% Cd were observed. The beads could be reused 5 times with good efficiency. X-ray diffraction and energy-dispersive spectra analysis indicated the heavy metals could be transformed into stable crystal texture, which was attributed to the carbonyl and acyl amino groups. http://ee.hnu.cn/eeold/php/news/pic/yunfeirandompic_1481468089.pdf

### NATURAL ATTENUATION OF CHLORINATED ETHENES IN HYPORHEIC ZONES: A REVIEW OF KEY BIOGEOCHEMICAL PROCESSES AND IN-SITU TRANSFORMATION POTENTIAL

Weatherill, J.J., S. Atashgahi, U. Schneidewind, S. Krause, S. Ullah, N. Cassidy, and M.O. Rivett. Water Research 128:362-382(2018)

The aquifer-river interface (i.e., hyporheic zone) is a critical pathway for chlorinated ethane (CE) discharge to surface water bodies in groundwater baseflow. The pore water system may represent a natural bioreactor where anoxic and oxic biotransformation process act in synergy to reduce or even eliminate contaminant fluxes to surface water. This review encompasses current process understanding of anaerobic CE respiration in the competitive framework of hyporheic zone biogeochemical cycling fuelled by in situ fermentation of natural organic matter. Anoxic-oxic interface development for metabolic and cometabolic mineralization by a range of aerobic bacteria is conceptualized with a focus on vinyl chloride degradation pathways. The superimposition of microbial metabolic processes occurring in sediment biofilms and bulk solute transport delivering reactants produces scale-dependent contaminant transformation rates. Insights from recent field experience of CE plumes discharging to surface water are discussed and a range of practical monitoring technologies is introduced to address the inherent complexity at different spatial scales.

### 3D NUMERICAL MODELLING OF A PULSED PUMPING PROCESS OF A LARGE DNAPL POOL: IN SITU PILOT-SCALE CASE STUDY OF HEXACHLOROBUTADIENE IN A KEYED ENCLOSURE

Giraud, Q., J. Goncalves, B. Paris, A. Joubert, S. Colombano, and D. Cazaux.
Journal of Contaminant Hydrology 214:24-38(2018)

A low-permeability keyed enclosure was built at the location of hexachlorobutadiene DNAPL source zone to isolate a finite volume of soil. A 3-month pulsed-pumping process was applied inside the enclosure to extract the DNAPL. No water was extracted during the process, and a total volume of ~20 $m^3$ of pure DNAPL was recovered. By using the 3D and multiphase flow simulator TMVOC, a conceptual model was elaborated and generated with the pre/post-processing tool mView. Numerical simulations reproduced the pulsed pumping process and showed an excellent match between simulated and field data of DNAPL cumulated pumped volume, and reasonable agreement between modeled and observed data for the evolution of the water/DNAPL interface elevations at the two wells. These results may be relevant to DNAPL pumping system optimization.

### TEMPORAL ABUNDANCE AND ACTIVITY TRENDS OF VINYL CHLORIDE (VC)-DEGRADING BACTERIA IN A DILUTE VC PLUME AT NAVAL AIR STATION OCEANA

Liang, Y., L.J. Cook, and T.E. Mattes.
Environmental Science and Pollution Research 24(15):13760-13774(2017)

In a long-term field study, researchers tracked the abundance and activity of microbial VC degraders in three monitoring wells along a dilute VC plume at Naval Air Station Oceana. High-throughput sequencing of partial 16S rRNA genes and transcripts revealed diverse groundwater microbial communities and showed that methanotrophs and anaerobic respirers (e.g., methanogens, sulfate reducers, and iron reducers) were among the most active and abundant guilds. Quantitative PCR analysis showed that among bacterial guilds with a potential to contribute to VC biodegradation, methanotrophs were the most abundant and active microbial group. Ethene-oxidizing bacterial populations were less abundant and relatively inactive compared to methanotrophs. Expression of functional genes associated with both aerobic VC oxidation and anaerobic VC reduction was observed in one well. The groundwater community was found to contain diverse active bacterial guilds previously associated with metabolic and cometabolic VC degradation processes under either aerobic or anaerobic conditions that might have contributed to the slowly decreasing VC concentrations at the NAS Oceana site over the 6-year study period.

### LABORATORY SCALE STUDY FOR REMEDIATION OF POLLUTED GROUNDWATER BY FERRATE TREATMENT

Vizsolyi, E.C., P. Dobosy, G.G. Lang, I. Varga, J. Varga, and G. Zaray.
Microchemical Journal 133:231-236(2017)

The goal of this experiment was realize simultaneous degradation of different organic contaminants in industrial groundwater by addition of freshly prepared, electrochemically produced ferrate solution and its rapid distribution by mixing. The degradation rates of 44 organic contaminants in the groundwater were determined by head-space gas chromatograph mass spectrometer system. These experimental data form the basis of a proposed industrial-scale technology for applying ferrate solution produced on site.
http://imsys.hu/wp-content/uploads/sites/10/2018/05/akkreditalt_analitikai_laboratorium_Laboratory_scale_study_for_remediation_of_polluted_groundwater.pdf

## General News

### SUPERFUND X-RAY FLUORESCENCE FIELD OPERATIONS GUIDE

U.S. EPA, Region 4 Superfund Division, Atlanta, GA. SFDGUID-001-R0, 23 pp, 19 Jul 2017

This guide was developed for consideration by Region 4 On-Scene Coordinators (OSCs) and Remedial Project Managers (RPMs) to provide the OSCs/RPMs with a methodology to collect defensible XRF data for lead and arsenic (and possibly other metals) in soil samples. The technical information provided for measuring concentrations of contaminants in soil in a practical, cost-effective, and timely manner does not constitute rulemaking by the Agency; the purpose of the guide is to aid in the collection of high-quality soil data for select contaminants that can be used in risk assessments. https://www.epa.gov/sites/production/files/2018-04/documents/superfund-field-operations-guide-001-r0_xrf_fog_reg4.pdf

### STANDARD OPERATING PROCEDURE FOR AN IN VITRO BIOACCESSIBILITY ASSAY FOR LEAD AND ARSENIC IN SOIL

U.S. EPA, Office of Land and Emergency Management. OLEM 9200.2-164, 33 pp, 20 Apr 2017

The purpose of this standard operating procedure (SOP) is to define the proper analytical procedure for the validated in vitro bioaccessibility (IVBA) assay for lead and arsenic in soil, to describe the typical working range and limits of the assay and quality assurance factors, and to indicate potential interferences. The method has been validated only for lead and arsenic in soil, not other contaminants or matrices (e.g., water, air, amended soils, dust, food, etc.). This SOP is intended to be used as a reference for developing site-specific quality assurance project plans and sampling and analysis plans. https://semspub.epa.gov/work/HQ/196750.pdf

### VALIDATION ASSESSMENT OF IN VITRO ARSENIC BIOACCESSIBILITY ASSAY FOR PREDICTING RELATIVE BIOAVAILABILITY OF ARSENIC IN SOILS AND SOIL-LIKE MATERIALS AT SUPERFUND SITES

U.S. EPA, Office of Land and Emergency Management. OLEM 9355.4-29, 25 pp, 20 Apr 2017

This report summarizes the basis for EPA's determination that the in vitro bioaccessibility (IVBA) method for arsenic has satisfied the validation and regulatory acceptance criteria for application of the method in an appropriate regulatory context. The arsenic method estimates site-specific relative bioavailability (RBA) of arsenic in soils quickly and inexpensively relative to in vivo methods and is well suited for regulatory use in arsenic risk assessment. https://semspub.epa.gov/work/HQ/196751.pdf

### BIFURCATING REMEDIAL DESIGN AND REMEDIAL ACTION TO ACCELERATE REMEDIAL DESIGN STARTS AT PRP-LEAD SUPERFUND SITES

U.S. Environmental Protection Agency, 4 pp, 21 June 2018

EPA has developed a new guidance memorandum to recommend that the EPA Regions consider using separate settlement tracks for remedial design and remedial action where negotiations for a single consent decree addressing both remedial design/remedial action are likely to be protracted. The new guidance memorandum is available on the Agency's website at https://www.epa.gov/enforcement/bifurcating-rdra-accelerate-remedial-design-starts-prp-lead-superfund-sites. More information on the Superfund Task Force Recommendations is available at https://www.epa.gov/superfund/superfund-task-force.

### NETWORK FOR INDUSTRIALLY CONTAMINATED LAND IN AFRICA (NICOLA)

NICOLA was established in October 2014 with the aim of providing a knowledge exchange platform for regulators, industry, service providers, and other stakeholders involved in contaminated land in Africa. The NICOLA forum promotes cooperation among industry, academia, and service providers on the development and application of sustainable technologies. The overall objective is to proactively enable the African industrial and mining sector to identify, assess, and manage contaminated land efficiently, cost-effectively, and within a framework of sustainability. The 4th annual NICOLA conference is scheduled for October 30-31, 2018, in Midrand, South Africa. https://nicola-org.com/

### EVALUATION AND MANAGEMENT STRATEGIES FOR PER- AND POLYFLUOROALKYL SUBSTANCES (PFASs) IN DRINKING WATER AQUIFERS: PERSPECTIVES FROM IMPACTED U.S. NORTHEAST COMMUNITIES

Guelfo, J.L., T. Marlow, D.M. Klein, D.A. Savitz, S. Frickel, M. Crimi, and E.M. Suuberg.
Environmental Health Perspectives 126(6):065001(2018)

Management challenges faced by stakeholders in regions experiencing PFAS releases were identified during stakeholder engagement events that connected attendees with PFAS experts in focus areas for fate and transport, toxicology, and regulation. Review of the literature provided perspective on challenges in all focus areas. In a case study, publicly available data were used to characterize sources of PFAS impacts in groundwater and to conduct a geospatial case study of potential source locations relative to drinking water aquifers in Rhode Island. The case study illustrates how risk-based geospatial methods can help address knowledge gaps regarding potential sources of PFASs in drinking water aquifers and evaluation of exposure risks.
https://ehp.niehs.nih.gov/EHP2727/

### ICARST 2017: INTERNATIONAL CONFERENCE ON APPLICATIONS OF RADIATION SCIENCE AND TECHNOLOGY, 24-28 APRIL, 2017, VIENNA, AUSTRIA: PROGRAMME & BOOK OF ABSTRACTS. 469 pp, 2017

This conference had several sessions on Radiation for Environmental Protection that offered presentations on radiation treatment (e.g., electron beam techniques) for remediation of gaseous pollutants, industrial wastewaters, municipal wastewater, sludge, and emerging organic pollutants in addition to uses of radioactive tracers for monitoring applications.
https://www-pub.iaea.org/iaeameetings/50814/International-Conference-on-Applications-of-Radiation-Science-and-Technology-ICARST-2017

### ICCE 2017: 16TH INTERNATIONAL CONFERENCE ON CHEMISTRY AND THE ENVIRONMENT, 18-22 JUNE 2017, OSLO, NORWAY

The abstracts (420 pages) and presentations of ICCE 2017 are available at http://icce2017.org/downloads/. The Detailed Program agenda file identifies the day, session, and time each presentation was made; this information is needed to locate the appropriate presentation file. Presentations are ordered according to their date, venue, and block of time. Follow the links on the left-hand side of the website to find the presentation of interest. Many studies on per- and polyfluoroalkyl compounds were presented at this conference.

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.

Mention of non-EPA documents, presentations, or papers does not constitute a U.S. EPA endorsement of their contents, only an acknowledgment that they exist and may be relevant to the Technology Innovation News Survey audience.