Technology Innovation News Survey

Entries for January 1-15, 2019

Market/Commercialization Information

COMBINED ANALYTICAL SERVICES CONTRACT REQUEST FOR INFORMATION (RFI)
U.S. Environmental Protection Agency, Washington, DC.
Federal Business Opportunities, Solicitation 68HERH19R0010, 2019

U.S. EPA is issuing this RFI to gather industry input on the forthcoming Statements of Work (SOWs) for the Combined Analytical Services Contract (CASC) and the interest and capability of potential offerors. The new procurement will include two different SOWs: (1) organic (SOM) and inorganic (ISM) services; and (2) High Resolution Superfund Methods (HRSM) services. Questions for which EPA invites responses are available in the CASC RFI file on FedConnect at https://www.fedconnect.net/FedConnect/?doc=68HERH19R0010&agency=EPA [Note: It might be necessary to copy and paste the URL into your browser for direct access]. Responses to the questions are due by 4:00 PM ET on March 1, 2019. https://www.fbo.gov/spg/EPA/OAM/HQ/68HERH19R0010/listing.html

DECOMMISSIONING SERVICES REQUIREMENTS IDIQ
DHHS, NIH, Office of Research Facilities/Office of Acquisitions, Bethesda, MD.
Federal Business Opportunities, Solicitation NIHOF201800050, 2019

This solicitation is set aside for woman-owned small business concerns, NAICS code 562910. Primary services anticipated under the resultant IDIQ Requirements Contract include environmental feasibility assessment, site characterizations, and remediation of identified and encountered hazards as required prior to renovation or demolition of NIH space. The main contaminant is expected to be mercury in various chemical and physical forms, along with other facility-intrinsic or research-related hazards. Contractor is to conduct investigations, remediate environmental contamination, and generate appropriate documentation for NIH. Selective demolition of facilities or other identified features might be necessary to support the remediation project. Proposals are due by noon ET on March 13, 2019. There is no incumbent contractor. https://www.fbo.gov/spg/HHS/NIH/ORS/NIHOF201800050/listing.html

HANFORD TANK CLOSURE CONTRACT (TCC) PROCUREMENT
U.S. DOE, Environmental Management Consolidated Business Center, Cincinnati, OH.
Federal Business Opportunities, Solicitation 89303319REM000044, 2019

This procurement is 100% full and open competition under NAICS code 562910 (Environmental Remediation Services), small business size standard 750 employees. The TCC contractor will provide services to conduct safe, compliant, and cost-effective operations and closure of the single-shell and double-shell tank farms on the Hanford Site. Critical scope covered under this contract includes services for the transition from the Tank Operations Contract (expires 9-30-19) to the TCC; operation and maintenance of the single-shell and double-shell tank farms, including volume management and secondary waste treatment facilities; completion of construction and O&M of equipment necessary to pretreat and feed low-level waste to the low-activity waste vitrification facility; single-shell tank waste remediation and closure; and core functions to support these efforts. A dedicated website has been established for this procurement at https://www.emcbc.doe.gov/SEB/TCC/. Proposals are due by 5:00 PM ET on March 18, 2019. https://www.fbo.gov/spg/DOE/PAM/HQ/89303319REM000044/listing.html

TECHNOLOGY/BUSINESS OPPORTUNITY: AQUEOUS URANYL DETECTION AND QUANTIFICATION USING BACTERIAL CELLS
LLNL Industrial Partnerships & Commercialization, Livermore, CA.
Federal Business Opportunities, Solicitation FBO416-19, 2019

Lawrence Livermore National Laboratory (LLNL) is offering the opportunity to enter into a collaboration to further develop and commercialize its novel innovation, Aqueous Uranyl Detection and Quantification Using Bacterial Cells (patent application PCT/US18/61667). LLNL researchers have developed whole-cell biosensors that can be used in aqueous samples for sensitive and selective in situ detection of the uranyl oxycation, with sensor functionality confirmed by detection of U concentrations as low as 1 uM in groundwater samples. LLNL seeks industry partners with a demonstrated ability to bring such inventions to market. Written expressions of interest are due by 11:59 PM ET on March 11, 2019. https://www.fbo.gov/spg/DOE/LLNL/LI/FBO416-19/listing.html

NAVFAC NW LTM O&M ENVIRONMENTAL SERVICES CONTRACT
Naval Facilities Engineering Command, NAVFAC Northwest, Silverdale, WA.
Federal Business Opportunities, Solicitation N4425519R6006, 2019

This procurement will be a total small business set-aside, NAICS code 562910, for a single contract to provide LTM O&M (long-term monitoring, operation and maintenance) environmental services for Navy facilities located within the United States. Firms with experience closing remediation sites, reducing maintenance or LTM costs, innovatively optimizing remedial systems, or with experience working on environmental projects in the Puget Sound area, Alaska North Slope, or the Aleutian Islands are strongly desired. Release of the RFP is planned for mid-February 2019. The resulting award is expected to be a firm-fixed-price IDIQ contract with a base period of 12 months and four 12-month options to replace current contract number N44255-14-D-9011 (Sealaska Environmental Services LLC) for similar services awarded in 2014, 6 months remaining. https://www.fbo.gov/spg/DON/NAVFAC/N44255/N4425519R6006/listing.html

USACE MEGA: TULSA DISTRICT RFP FOR ENVIRONMENTAL REMEDIATION SERVICES
Department of the Army, U.S. Army Corps of Engineers, USACE District, Tulsa, OK.
Federal Business Opportunities, Solicitation W912BV19R0022, 2019

This synopsis serves solely as presolicitation notification for a future acquisition to be competed as a 100% small business set-aside as part of the U.S. Army Corps of Engineers Northwest, Southwest, and South Pacific divisions' Multiple Environmental Government Acquisition (MEGA) Plan. Release of the solicitation is anticipated around February 21, 2019, on FedBizOpps. The USACE Tulsa District intends to award a firm-fixed-price, indefinite-delivery Multiple Award Task Order Contract (MATOC) for environmental remediation services for projects within the geographic boundaries of the Southwest Division (SWD) and projects assigned to the SWD for the control and remediation of environmental contamination from pollutants, toxic substances, radioactive materials, hazardous materials, munitions and explosives of concern, and munitions constituents. Award of up to five IDCs is anticipated with a maximum shared capacity of $45M. Contracts will have a base period of three years and one two-year option period. The applicable NAICS code is 562910, small business size standard 750 employees. https://www.fbo.gov/spg/USA/COE/DACA56/W912BV19R0022/listing.html

Cleanup News

COMBINING PERSULFATE, IN SITU FERRATE GENERATION AND ENHANCED BIOREMEDIATION FOR SAFER, MORE EFFECTIVE REMEDIAL ACTIONS
Moody, W. and J. Mueller.
47th Annual Environmental Show of the South, 16-18 May 2018, Chattanooga, TN. 23 slides, 2018

Provect-OX® is a pre-mixed, dry powder containing sodium persulfate, ferric oxide, and buffer that can be easily applied into a subsurface environment via direct mixing, hydraulic fracturing, pneumatic fracturing, and direct push injection of slurries. Ferrate and sulfate radicals will be continuously generated in situ to support extended oxidation of persistent compounds, provided that persulfate is maintained with iron as an activator. Residual iron and sulfate will support bioremediation processes to manage partially oxidized compounds and residual contaminants that continually desorb from the matrix over time (~3-5 years). This presentation outlines parameters considered for calculating material requirements, discusses field application considerations, and summarizes performance data and costs from example projects.
https://www.tn.gov/content/dam/tn/environment/solid-waste/documents/esos/sw_esos-14_2018-05-16-1330-moody.pdf

SUCCESSFUL CLOSURE OF A DNAPL SITE: LESSONS LEARNED
Cox, C.
Abstract Book: AEHS Foundation 34th Annual International Conference on Soils, Sediments, Water and Energy, 15-18 October 2018, Amherst, MA. p 171, 2018

A 500-gal release of TCE presented as a DNAPL beneath an industrial building and in perched water bodies within a glacial till setting in Ohio. Injected fluids can mobilize the source and provide a false indication of success, and in this case, pre- and post-injection membrane interface probe evaluations demonstrated that the TCE was forced into new areas ahead of the injectant. Following excavation and two phases of high-vacuum dual-phase extraction followed by potassium permanganate flooding, the site was closed under RCRA by 2007 and now has completed the post-closure care and monitoring period. Mass reduction was assessed using continuously monitored vapor stream concentrations, recovered fluid concentrations, and the results of phased 3D soil sampling efforts. Multiple lines-of-evidence estimates of mass removal ranged from 89% to 96%. *See slides for additional information*:
https://www.epa.state.oh.us/portals/30/Brownfield_Conference/docs/Craig%20Cox2.pdf

COKE OVEN INTERIM MEASURES PROGRESS REPORT, TRADEPOINT ATLANTIC, SPARROWS POINT, MARYLAND
Maryland Department of Environment, 2273 pp, 2018

Operational information and monitoring data collected over the full year of 2017 are presented for interim measures (IMs) installed to address mainly hydrocarbons (benzene, naphthalene) at the former Coke Oven (CO) special study area located at the Tradepoint Atlantic property, Baltimore County, Maryland. The IMs currently in operation at the CO are located within five distinct smaller areas designated as Cells 1-3, 5, and 6. Cell 1 has an air sparge/soil vapor extraction (AS/SVE) system; Cell 2 has an AS/SVE system in the shallow groundwater zone and groundwater pump and treat system in the intermediate zone; Cell 3 has an AS/SVE system; Cell 5 has a dual-phase extraction system for the shallow zone and a coal tar DNAPL recovery system; and Cell 6 has multi-phase extraction of LNAPL. This progress report provides a brief description of each IM system; notable operations activities that occurred during 2017; a discussion of operational and analytical data from 2017; an evaluation of the effectiveness of the IM systems; and recommendations for continuation or modification of the current IM systems.
https://mde.maryland.gov/programs/LAND/MarylandBrownfieldVCP/Documents/Sparrows%20Point%20Hazardous%20Waste%20Site/Coke%20Oven%20IM%20Progress%20Report%20rev.0%202-9-2018.pdf

PERFORMANCE MONITORING IN CLAY TILL THREE YEARS AFTER FULL-SCALE ZVI TREATMENT WITH DPT JET INJECTION
Ross, C., W. Slack, N. Durant, D. Baird, D. Knight, D. Chlebica, and D. Eberle.
Abstract Book: AEHS Foundation 34th Annual International Conference on Soils, Sediments, Water and Energy, 15-18 October 2018, Amherst, MA. p 42, 2018

Direct-push technology jet injection was used during full-scale treatment of a chlorinated solvent source zone at a site in Denmark, where 55 tons of micro-scale zero-valent iron blended with sand was injected into the clay till target treatment zone. The project included extensive post-injection assessment plus extensive membrane interface probe borings. Conventional soil sampling showed the total estimated chlorinated solvent mass in soil decreased by over 68% in 6 months and 82% in 30 months. Groundwater data collected from wells transecting the dissolved contaminant plume showed substantial reduction in chlorinated solvent mass flux out of the treatment zone, indicating that chlorinated solvent mass discharge from the source area declined by 89% after 30 months. *Additional information*: http://upds.org/wp-content/uploads/2018/11/2016-6.2-jimwragg-directpushhigh-pressurejetinjection.pdf

SUSTAINABLE COMBINATION HEATING: AN INNOVATIVE APPROACH FOR IN SITU THERMAL REMEDIATION IN CHALLENGING LITHOLOGY
Dablow, J., M. Dawes, G. Mackey, D. Nelson, J. Baldock, and K. Schnell.
RemTech 2018: 10-12 October, Banff, Alberta, Canada. 22 slides, 2018

Two sites, one in California and one in Switzerland, were remedied using a combination of in situ thermal remediation technologies to mitigate source zone impacts in lithologies where relatively low-permeability silts and clays are underlain by high permeability sands and gravels. At the Switzerland site a mixture of high boiling point compounds leached from a landfill was treated via thermal conductive heating and steam enhanced extraction (SEE) to achieve stringent concentration-based remedial goals. The estimated total mass removed in Switzerland was ~6,200 kg, of which ~75% comprised TCE and o-DCB. At the California site, a combination of electrical resistance heating and SEE was applied in November 2017 at a former manufacturing site contaminated by chlorinated solvents. Remedial goals were met in May 2018.
Slides: https://www.esaa.org/wp-content/uploads/2018/10/18-Dablow.pdf
Longer abstract: https://www.esaa.org/wp-content/uploads/2016/05/Abstracts-RT2018-65.pdf

Demonstrations / Feasibility Studies

A PILOT-SCALE FIELD STUDY: IN SITU TREATMENT OF PCB-IMPACTED SEDIMENTS WITH BIOAMENDED ACTIVATED CARBON
Payne, R.B., U. Ghosh, H.D. May, C.W. Marshall, and K.R. Sowers.
Environmental Science & Technology [publication online 30 Jan 2019 prior to print]

A pilot study was conducted for 409 days on PCB-impacted sediments in four 400 m^2 plots located in a watershed drainage pond. Treatments with activated carbon (AC) agglomerate bioamended with PCB-dechlorinating and oxidizing bacteria decreased the PCB concentration in the top 7.5 cm by up to 52%, aqueous concentrations of tri- to nona-chlorobiphenyl PCB congeners by as much as 95%, and coplanar congeners by up to 80% in sediment. No significant decrease in PCB concentrations was observed in non-bioamended plots with or without AC, nor did bioaugmentation and AC addition significantly alter total microbial diversity. *See more on this project in an ESTCP report at*
https://www.serdp-estcp.org/content/download/48048/457538/file/ER-201215%20Final%20Report.pdf

GAS THERMAL REMEDIATION OF AN ORGANIC CONTAMINATED SITE: FIELD TRIAL
Xu, J, F. Wang, C. Sun, X. Zhang, and Y. Zhang.
Environmental Science and Pollution Research International [Published online 6 Jan 2019 prior to print]

The performance of in situ gas thermal remediation (GTR) was tested in China for the first time for remediation of soil and groundwater affected mainly by benzene, chlorobenzene, and petroleum. To evaluate the effectiveness of GTR, heating and extraction wells were installed in a 100 m ^{2} soil area to 18 m depth. During the 34 days of system operation, temperature ranged 100-200°C, and pressure was 0.5-2.0 kPa. Soil and groundwater sampled 7 days after system shutdown showed that the temperatures of the central remediation area and around the heating well were higher than at the edges, with surface soil having the lowest average temperature and soil at 3-6 m depth having the highest temperatures. Respectively, removal rates of benzene, chlorobenzene, and petroleum were up to 99.81, 99.72, and 98.23% in soil and up to 98.77, 97.70, and 99.99% in groundwater.

EXPEDITING GROUNDWATER REMEDIATION THROUGH ENHANCED ATTENUATION AT THE MOUND, OHIO, SITE
Zimmerman, B., S. Smiley, B. Looney, and B. Cato.
2018 Long-Term Stewardship Conference, August 20-23, Grand Junction, Colorado. 17 slides, 2018

Although groundwater pump and treat was the originally selected remedy for the OU-1 area, the cleanup timeframe for the P&T remedy was projected to require substantially longer than the cleanup timeframe for cometabolic bioremediation. In 2014, DOE initiated a multi-year field demonstration to evaluate whether using edible oils to create "structured geochemical zones" and support passive natural attenuation processes for VOCs in soil and groundwater could expedite remediation of PCE and daughter products in the groundwater. Initially scheduled to operate for 3 years, impacts from an off-site dewatering operation and regional drought conditions during Year 2 caused perturbation in demonstration data trends, leading to extension of the project to include a fourth year. Nearing completion of the final year, results indicate the OU-1 groundwater system has recovered from the effects of the lowered groundwater levels and increased hydraulic gradients experienced in Year 2. Year 3 demonstration results indicate the dissolved-phase PCE and TCE plumes continue to decrease in size and mass.
https://www.energy.gov/sites/prod/files/2018/10/f56/Zimmerman-Expediting-Groundwater-Remediation.pdf

Research

PER- AND POLYFLUOROALKYL SUBSTANCES IN SOURCE AND TREATED DRINKING WATERS OF THE UNITED STATES
Boone, J.S., C. Vigo, T. Boone, C. Byrne, J. Ferrario, R. Benson, J. Donohue, J.E. Simmons, D.W. Kolpin, E.T. Furlong, and S.T. Glassmeyer.
Science of the Total Environment 653:359-369(2019)

Scientists measured 17 per- and polyfluoroalkyl substances (PFASs) in source and treated water from 25 drinking water treatment plants (DWTPs) as part of a broader study of contaminants of emerging concern (CECs) in drinking water across the United States. PFAS were quantitatively detected in all 50 samples, with summed concentrations of the 17 PFAS ranging from This paper is **Open Access** at https://www.sciencedirect.com/science/article/pii/S004896971834141X

UNMANNED LIDAR FOR LEGACY MANAGEMENT
Soliday, B.
2018 Long-Term Stewardship Conference, August 20-23, Grand Junction, Colorado. 21 slides, 2018

Although manned aircraft were once required for aerial LiDAR (Light Detection and Ranging) surveys, advances in LiDAR technology have resulted in smaller units that can be carried by mid-sized unmanned aircraft systems (UASs). DOE's Office of Legacy Management is implementing UAS surveys as an additional tool for augmenting long-term surveillance and maintenance activities. UASs can be used for quantitative documentation of existing site conditions with high resolution and accuracy, and subsequent UAS surveys allow detection of changes in site conditions, such as erosion or settlement. To evaluate the accuracy and precision of UAS surveys, two different UAS platforms and three different sensors were deployed at a 500-acre disposal cell site. The UAS data were processed to create 3D data points and digital surfaces, which then were compared to land-based GPS survey data. Preliminary results indicate that UAS have the potential to provide significant benefits in terms of cost, data quality, and human health and safety. https://www.energy.gov/sites/prod/files/2018/10/f57/Soliday-Unmanned-LIDAR-Legacy-Mgmt_0.pdf

EVALUATING GROUNDWATER AND CONTAMINANT FLUX USING PASSIVE FLUX METERS
Jarrett, M.
2018 Long-Term Stewardship Conference, August 20-23, Grand Junction, Colorado. 12 slides, 2018

Groundwater flux at the Pantex Plant northeast of Amarillo, Texas, typically has been calculated (i.e., not measured) to evaluate movement of contaminated water, groundwater flux through the in situ bioremediation systems, and future risk. These calculations can be effective in most areas of the contaminated perched groundwater, but with the aquifer's continued dewatering uncertainty has arisen regarding movement of contaminated water in an in situ bioremediation zone. The passive flux meter (developed at the University of Florida) is a custom-made device that is inserted into wells to measure groundwater and contaminant flux. Consisting of an activated carbon matrix and resins pre-loaded with alcohol tracers, the device allows for vertical profiling of the groundwater and contaminant flux. Use of this innovative technology at Pantex helped identify areas where flux is continuing to occur into and downgradient of an in situ bioremediation system and provided additional data about preferential flow through an area outside the influence of current pump-and-treat remedial action. This information allows for a more focused response to the groundwater cleanup and evaluation of future risk. https://www.energy.gov/sites/prod/files/2018/10/f56/Jarrett-Evaluating-Groundwater.pdf

DEVELOPMENT OF A METHODOLOGY FOR THE DERIVATION OF AQUATIC PLANT WATER QUALITY CRITERIA
Thursby, G. and M. Lewis. EPA 600-R-18-025, 69 pp, 2015

This report provides a means to evaluate small toxicity data sets to estimate the value of additional data. The method relies on the observed and expected ratio of toxicity values for the least and most sensitive species in each data set. The minimum data requirements are not recommended based on a fixed number or test species or a particular list of desirable species to include; instead, the recommendations rely on guidance for examining the overall quality and representativeness of the sensitivity distribution with any available data. The authors show that a reasonable estimate of the aquatic plant sensitivity distribution is possible using only the recommended FIFRA-5 aquatic plant species as a starting point. https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=P100UZIV.txt

ENVIRONMENTALLY SUSTAINABLE AND ECOSAFE POLYSACCHARIDE-BASED MATERIALS FOR WATER NANO-TREATMENT: AN ECO-DESIGN STUDY
Corsi, I., A. Fiorati, G. Grassi, I. Bartolozzi, T. Daddi, L. Melone, and C. Punta.
Materials (Basel) 11(7):PMC6073422(2018)

In this review, a critical analysis of nanotechnologies for water remediation assesses their sustainability in terms of efficient removal of pollutants, appropriate methods for monitoring their effectiveness, and protocols for evaluation of potential environmental risks. The intent is to furnish guidelines for sustainable water management. New nanostructured polysaccharide-based materials obtained from renewable resources are presented as alternative efficient and ecosafe solutions for water treatment along with eco-design indications to improve the sustainability of nanomaterials production based on life-cycle assessment methodology. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6073422/

BIOREMEDIATION OF COMMERCIAL POLYCHLORINATED BIPHENYL MIXTURE AROCLOR 1260 BY NATURALLY OCCURRING MICROORGANISMS
Pathiraja, Pathiraja Mudiyanselage Gathanayana, Ph.D. thesis, Queensland University of Technology, Australia. 329 pp, 2018

The study outcomes confirmed that while a single bacterium may seem initially to possess positive characteristics for PCB biodegradation, it is highly probable that one microbe does not possess the enzymatic capability to degrade all or even most of the PCB congeners present in a contaminated environment. Microorganisms isolated from soil and sediments were studied and a few (*Achromobacter, Ochrobactrum* and *Lysinibacillus* in consortium) were found able to solubilize and degrade PCB mixtures effectively under alternating anaerobic and aerobic treatment conditions. A conventional 2-stage (TS) anaerobic-aerobic treatment was compared to an alternating (AN) anaerobic-aerobic treatment. The TS process was set up to provide an extended anaerobic phase of 4 weeks followed by a short aerobic phase of 2 weeks. In contrast, the AN treatment comprised weekly intervals of anaerobic and aerobic conditions. The AN approach performed more efficiently compared to TS treatment with yields of nearly 50% reduction in total PCBs reached within the first 2 weeks compared to 24% reduction obtained in TS treatment. https://eprints.qut.edu.au/122925/

ALUMINA-MEDIATED MECHANOCHEMICAL METHOD FOR SIMULTANEOUSLY DEGRADING PERFLUOROOCTANOIC ACID AND SYNTHESIZING A POLYFLUOROALKENE
Lv, H., N. Wang, L. Zhu, Y. Zhou, W. Li, and H. Tang.
Green Chemistry 20(11):2526-2533(2018)

Researchers developed an alumina-mediated solid-state mechanochemical (MC) method to simultaneously degrade PFOA and synthesize 1H-perfluorohept-ene (1H-1-PFHp), which is a valuable organofluorine block. A 2.5-h MC treatment resulted in nearly complete removal (99.4%) of PFOA and a high yield (92.5%) of 1H-1-PFHp. In this transformation, the surface hydroxyl groups on alumina are critical for anchoring the PFOA molecules during the defluorination reaction, and the milling process promotes the dehydration of alumina to produce reactive Lewis acid sites for activating the C-F bonds. High-energy ball milling initiates simultaneously the release of lattice oxygen from alumina, producing oxygen vacancies (in alumina) and free electrons, the latter of which can induce the breakage of C-F bonds via a reductive pathway. The combination of the mechanocaloric effect and the triple roles of alumina drive PFOA to a controlled defluorination.

MECHANOCHEMICAL ENHANCEMENT OF THE NATURAL ATTENUATION CAPACITY OF SOILS USING TWO ORGANOPHOSPHATE BIOCIDES AS MODELS
Hu, A., G. Cagnetta, J. Huang, and G. Yu.
Journal of Hazardous Materials 360:71-81(2018)

The mechanochemical activation of four major soil components via ball milling induces generation of electrons on particle surfaces. The phenomenon was demonstrated to occur on oxides by formation of trapped electrons in oxygen vacancies as well as on quartz and clayey materials to form fresh electron-rich surfaces by homolytic bond rapture. Results from ball milling two toxic organophosphate biocides, chlorpyrifos and glyphosate, as model pollutants showed that the aromatic structure of chlorpyrifos determined a faster degradation rate compared to the aliphatic one of glyphosate because of the higher stability of generated radical intermediates. The aromatic moiety facilitated adsorption on clays, thus temporarily sequestering the molecule and delaying its degradation. Both organophosphates mineralized to an inorganic form. http://www.academia.edu/38124596/Hu_2018_J_Hazard_Mat_-_Soil_MC_activation.pdf

THERMALLY ENHANCED IN SITU BIOREMEDIATION OF GROUNDWATER CONTAMINATED WITH CHLORINATED SOLVENTS: A FIELD TEST
Nemecek, J., J. Steinova, R. Spanek, T. Pluhar, P. Pokorny, P. Najmanova, V. Knytl, and M. Cernik.
Science of the Total Environment 622623:743-755(2018)

Thermally enhanced in situ bioremediation was tested in aquifers situated in sandy saprolite and underlying fractured granite. The system comprised pumping, heating, and subsequent injection of contaminated groundwater, aiming at an aquifer temperature of 20-30°C. A fermentable substrate (whey) was injected in separate batches. The test was monitored using hydrochemical and molecular tools (qPCR and NGS). Addition of the substrate and increased temperature promoted a rapid increase in the abundance of reductive dechlorinators [e.g., *Dehalococcoides mccartyi*, *Dehalobacter* sp., and functional genes *vcrA* and *bvcA*) and a strong increase in CVOC degradation. On day 34, CVOC concentrations decreased by 87-96% in groundwater from the wells most affected by the heating and substrate. On day 103, CVOC concentrations were below the limit of quantitation, resulting in degradation half-lives of 5 to 6 days. Neither an increase in biomarkers nor a distinct decrease in the CVOC concentrations was observed in a deep well affected by the heating but not by the substrate. NGS analysis detected *Chloroflexi* dechlorinating genera (*Dehalogenimonas* and GIF9 and MSBL5 clades) and other genera capable of anaerobic metabolic degradation of CVOCs. Of these, bacteria of the genera *Acetobacterium, Desulfomonile, Geobacter*, *Sulfurospirillum*, *Methanosarcina*, and *Methanobacterium* were stimulated by the substrate and heating. In contrast, groundwater from the deep well (affected by heating only) hosted representatives of aerobic metabolic and aerobic cometabolic CVOC degraders. Results document that heating in the treated aquifer accelerated the treatment process significantly if in the presence of abundant substrate.

TESTING THE SINGLE-PASS VOC REMOVAL EFFICIENCY OF AN ACTIVE GREEN WALL USING METHYL ETHYL KETONE (MEK)
Torpy, F., N. Clements, M. Pollinger, A. Dengel, I. Mulvihill, C. He, and P. Irga.
Air Quality, Atmosphere & Health 11(2):163-170(2018)

A novel approach to quantifying VOC removal effectiveness by an active living green wall uses a mechanical system to force air through the substrate and plant foliage. After developing a single-pass efficiency protocol to understand the immediate effects of the system, an active green wall was installed into a 30-m ^{3} chamber representative of a single room and presented with the contaminant 2-butanone (methyl ethyl ketone, or MEK), a VOC commonly found in interior environments through its use in textile and plastic manufacture. Chamber inlet levels of MEK remained steady at 33.91 ± 0.541 ppbv. When the forced-air system drew the contaminated air through a green wall growing in a soil-less medium containing activated carbon, the combined effects of substrate media and botanical component within the biofiltration system showed statistically significant VOC reduction, averaging 57% single-pass removal efficiency over multiple test procedures and thus indicating the potential of active biofiltration in reducing VOC exposure in the indoor environment. *This paper is* ***Open Access*** *at* https://link.springer.com/article/10.1007/s11869-017-0518-4

DEVELOPMENT OF A PASSIVE FLUX METER APPROACH TO QUANTIFYING 1,4-DIOXANE MASS FLUX
Annable, M.D., M. Miller, and J. Cho.
SERDP Project ER-2304, 87 pp, 2018

The passive flux meter (PFM) was developed at the University of Florida in 2001 to obtain direct measurements of contaminant mass flux and Darcy flux at contaminated sites. Increased error may occur when using PFM where low-partitioning contaminants are involved. The objective of this study was to develop a modified PFM approach to quantifying contaminant flux of low-partitioning contaminants while simultaneously measuring Darcy flux with an acceptable measurement error. Modifications were proposed based on past studies of the passive surface-water flux meter (PSFM) and low-density polyethylene (LDPE) passive diffusion samplers. Designs incorporating modified permeability were tested in box aquifer setups. https://www.serdp-estcp.org/content/download/48564/462173/file/ER-2304%20Final%20Report.pdf

General News

EPA'S PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) ACTION PLAN
U.S. EPA, Washington, DC. EPA 823-R-18-004, 72 pp, 2019

Per- and polyfluoroalkyl substances (PFASs), a group of synthetic chemicals that have been in use since the 1940s, are found in a wide array of consumer and industrial products. Evidence indicates that continued exposure above specific levels to certain PFASs may lead to adverse health effects. This Action Plan describes EPA's approach to identifying and understanding PFASs, approaches to addressing current PFAS contamination, preventing future contamination, and effectively communicating with the public about PFASs. The Action Plan describes broad actions underway to address challenges with PFASs in the environment, including next steps on four PFAS management actions: (1) initiating steps to evaluate the need for an MCL for PFOA and PFOS; (2) beginning the necessary steps to propose designating PFOA and PFOS as "hazardous substances" through one of the available federal statutory mechanisms; (d) developing groundwater cleanup recommendations for PFOA and PFOS at contaminated sites; and (4) developing toxicity values or oral RfDs for GenX chemicals and perfluorobutane sulfonic acid (PFBS). In addition to these actions, EPA's PFAS Action Plan identifies other short- and long-term actions currently being implemented to understand and address PFASs. https://www.epa.gov/sites/production/files/2019-02/documents/pfas_action_plan_021319_508compliant_1.pdf

DATA REVIEW AND VALIDATION GUIDELINES FOR PERFLUOROALKYL SUBSTANCES (PFASS) ANALYZED USING EPA METHOD 537
Caporale, C., G. Dodo, K. Feddersen, B. Pepich, et al.
EPA 910-R-18-001, 47 pp, 2018

This document contains guidance to aid the data reviewer in determining the usability of analytical data generated for perfluoroalkyl substances. It is primarily based on EPA Method 537 and the general validation approach developed under EPA's Contract Laboratory Program. This guide is intended to be applicable to data gathered using EPA Method 537 for investigative purposes. Data users evaluating drinking water sample results or assessing potential human exposure relative to published drinking water health advisory levels should not qualify or use analytical result data that fail Method 537 quality control criteria. To make appropriate judgments, the reviewer needs a complete understanding of the intended use of the data and is strongly encouraged to establish a dialogue with the data user prior to and following the data review, to discuss usability issues and resolve questions regarding the review. https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=P100WW12.txt

DEPARTMENT OF ENERGY: PROGRAM-WIDE STRATEGY AND BETTER REPORTING NEEDED TO ADDRESS GROWING ENVIRONMENTAL CLEANUP LIABILITY
U.S. Government Accountability Office.
GAO-19-28, 48 pp, 29 Jan 2019

According to DOE's FY 2018 financial statement, the DOE Office of Environmental Management (EM) faces an environmental liability of $377B. This amount largely reflects estimates of future costs to clean up legacy radioactive tank waste and contaminated facilities and soil. From FYs 2011-2018, EM's environmental liability grew by about $214B, outpacing its cleanup spending of about $45B for that time period. For example, EM's environmental liability increased by nearly $130B from FY 2014-2018 at the Hanford Site in Washington State, in part because of contract and project management problems with waste cleanup. GAO found that EM's liability likely will continue to grow, in part because the costs of some future work are not yet included in the estimated liability, such as over $2.3B in costs associated with 45 contaminated facilities potentially transferable to EM from other DOE programs. EM relies primarily on individual sites to negotiate cleanup activities locally and establish priorities. For example, two EM sites had plans to treat similar radioactive tank waste differently, with costs at one site possibly tens of billions more than those at the other site. EM sites generally do not consider other sites' risks and priorities when making cleanup decisions. Without a strategy that sets national priorities and describes how DOE will address its greatest risks, EM lacks assurance that it is making the most cost-effective cleanup decisions across its sites. https://www.gao.gov/products/GAO-19-28

ENGINEERING TOOLS FOR ENVIRONMENTAL RISK MANAGEMENT: 4. RISK REDUCTION TECHNOLOGIES AND CASE STUDIES
Gruiz, K., T. Meggyes, and E. Fenyvesi (eds).
CRC Press, Boca Raton, FL. ISBN: 9781138001572, 558 pp, 2018

The success of remediation at contaminated industrial sites depends on the selection of appropriate conventional and innovative methods. This volume classifies remedial technologies and describes a "reactor approach" to understanding and managing in situ technologies similarly to reactor-based technologies. Passive artificial ecosystems, biodegradation-based remediation, and natural attenuation demonstrate the use of green technologies and show how engineering intervention can be minimized to limit damage to the environment. Management of inorganic contamination from the mining industry includes general discussions of leaching, bioleaching, and acid mine drainage. A case study of an abandoned mine in Hungary describes the innovative application of combined phytostabilization and chemical treatment. Biological and physicochemical methods, electrochemical remediation, and nanotechnologies are also addressed. *View the table of contents and chapter abstracts at* https://www.taylorfrancis.com/books/9781138001572

THE 34th ANNUAL INTERNATIONAL CONFERENCE ON SOILS, SEDIMENTS, WATER AND ENERGY, 15-18 OCTOBER 2018, UNIVERSITY OF MASSACHUSETTS AT AMHERST: ABSTRACT BOOK

The Association for Environmental Health & Sciences (AEHS) Foundation, 208 pp, 2018

Over the past 33 years this conference has evolved from a meeting about underground storage tanks into one of the premier environmental conferences in the United States, attended annually by 600-800 individuals from a wide variety of disciplines, including state and federal agencies, military, industry, utilities, environmental consulting, and academia. International participation has continued to expand. Topics encompass emerging contaminants, remediation case studies, health risks, vapor intrusion, issues in environmental security, sediments, brownfields, sustainable remediation, and decision support tools.
http://www.aehsfoundation.org/Member/aehsfoundation/Files/Abstract%20Book%20-%20EC2018.pdf

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