Technology Innovation News Survey

Entries for May 1-15, 2020

Market/Commercialization Information

FORMER FORT ORD MEC SUPPORT IDIQ

U.S. Army Engineering District, Sacramento, CA.
Contract Opportunities at Beta.SAM, Solicitation W9123820R0034, 2020

The objective of this solicitation is to award to a small business an IDIQ Single-Award Task Order Contract (SATOC) with a 5-year ordering period, NAICS code 562910. The requirements are to provide UXO technical support, annual surface monitoring and reporting, license maintenance, munitions security guarding, and homeless encampment cleanup at Fort Ord, California. Offers are due by 12:00 noon PT on July 8, 2020.
https://beta.sam.gov/opp/b0dd3553f6c14936a31ada1be249c7d5/view

ST. LOUIS RIVER AOC AZCON SLIP SEDIMENT REMEDIATION

U.S. Army Engineering District, Detroit, MI.
Contract Opportunities at Beta.SAM, Solicitation W911XK-20-B-0014, 2020

This procurement is a total small business set-aside under NAICS code 562910. Contractor is to provide all work, materials, equipment, labor, supervision, management, and administration to construct a remedial cap in Azcon/Duluth Seaway Port Authority slip in the Duluth-Superior Harbor, St. Louis, MN. This slip has areas with sediment concentrations for contaminants of concern above the respective cleanup levels. Contractor is to mobilize to the site in Duluth-Superior Harbor and install a silt curtain; dredge the slip with a mechanical plant and treat sediment in scows at the slip with 5% Portland cement; transport to Erie Pier for offload into trucks; and make disposal at a local landfill. Cap will have two layers: Layer A, consisting of dredged material from the Duluth Anchorage Area navigation channel, followed by Armor Stone. The remedial footprint is about 2.8 acres. Offers are due by 2:00 PM ET on July 10, 2020. https://beta.sam.gov/opp/944513aed3ef4b919994d9167974e6a0/view

$60M SMALL BUSINESS ENVIRONMENTAL CONSULTING SERVICES MATOC UNDER THE MEGA STRATEGY FOR OMAHA DISTRICT, NORTHWESTERN DIVISION

U.S. Army Engineering District Omaha, NE.
Contract Opportunities at Beta.SAM, Solicitation W9128F20R0053, 2020

This procurement is a small business set-aside under NAICS Code 541620 for environmental consulting services in support of the USACE Northwestern Division, Omaha District and its existing customers. The intent is to award up to three IDIQ contracts under this MATOC (multiple-award task-order contracts) solicitation as part of the USACE MEGA (multiple environmental government acquisition) strategy. Contracts will have a basic ordering period of three years plus one two-year option period or until the $60M contract limit is reached. The contracts will support work for the DoD Sustainable Range Program; Environmental Support for Others Program; U.S. EPA; control of environmental contamination from pollutants, toxic substances, and radioactive or hazardous materials; restoration and natural, historical, and cultural resource management; environmental compliance, stewardship, and sustainability; and all other environmentally related regulatory programs. Offers are due by 2:00 PM CT on July 13, 2020.
https://beta.sam.gov/opp/a80c1b700c794ffb97b56f792cb8ca04/view

ENVIRONMENTAL REMEDIATION DREDGING OF TIDAL FLATS AND AN OUTFALL DRAINAGE CHANNEL STRATFORD ARMY ENGINE PLANT

U.S. Army Corps of Engineers, New England District, Concord, MA.

The USACE New England District (CENAE) is inviting responses to this special notice for environmental remediation dredging of tidal flats and an outfall drainage channel in the Housatonic River adjacent to the Stratford Army Engine Plant, Stratford, Connecticut. No solicitation is available at this time; release of the RFP is anticipated in or around November 2020. The purpose of this announcement is to solicit input from industry as to the construction means and methods as well as anticipated construction durations for the proposed work. The NAICS code is 562910 (750 employees). Project award is planned using a Design-Bid-Build model. Construction is expected to take 18 months, with in-water work beginning on or around July 1, 2021. The present notice contains a list of questions for industry about this proposed project and its potential issues. Responses are due by 3:00 PM ET on July 13, 2020.
https://beta.sam.gov/opp/50aab181481b4a79847c261cc8cfab27/view

SUPERFUND RESEARCH PROGRAM: OCCUPATIONAL HEALTH AND SAFETY EDUCATION PROGRAMS ON EMERGING TECHNOLOGIES

DHHS, National Institutes of Health, Funding Opportunity RFA-ES-20-011, 2020

This program is offering institutions of higher education an opportunity to develop and implement educational programs on the occupational health and safety management practices for emerging technologies (e.g., emerging hazardous waste products, alternative (green) chemistry, biotechnology, nanotechnology, electronic waste, 3-D printing, sustainable remediation, and exposure and environmental detection technologies), emerging contaminants, and disaster response research and/or lab practices involving emerging technologies. Applications will close by 5:00 PM ET on August 3, 2020. The award ceiling is $250,000.
https://www.grants.gov/web/grants/view-opportunity.html?oppId=326651

SBIR E-LEARNING FOR HAZMAT AND EMERGENCY RESPONSE

DHHS, National Institutes of Health, Funding Opportunity RFA-ES-20-012, 2020

Grant applications are sought from small business concerns that propose to further the development of advanced technology training products for the health and safety training of HAZMAT workers; waste treatment personnel; skilled

support personnel associated with an emergency/disaster; emergency responders in biosafety response, infectious disease training and cleanup; emergency responders in disasters and resiliency training. Additionally, tools are sought to assist research into the acute and long-term health effects of environmental disasters. See more information at http://grants.nih.gov/grants/guide/rfa-files/RFA-ES-20-012.html. Training tools may include online training, virtual reality, and serious gaming. These products must complement the goals and objectives described at http://www.niehs.nih.gov/careers/hazmat/about_wetp/. The major objective is to prevent work-related harm by assisting in the training of workers in how best to protect themselves and their communities from exposure to hazardous materials. Award ceilings of $100,000 are anticipated from $282,500 in estimated total program funding. The closing date for applications is August 10, 2020.
https://www.grants.gov/web/grants/view-opportunity.html?oppId=327237

Cleanup News

NRC ALASKA, LLC MOOSE CREEK FACILITY THERMAL REMEDIATION OF PFAS-CONTAMINATED SOIL

Alaska Department of Environmental Conservation, 10 pp, 2019

The Moose Creek Facility thermally remediates contaminated soils and other related materials and is now permitted to accept PFAS-contaminated soils. A preliminary test in November 2017 demonstrated proof-of-concept and evaluated operational requirements to thermally remove PFAS from contaminated soil on a commercial scale. Following positive results, a second test trial was completed in May 2018 to evaluate operating capacities, establish operational procedures, and quantify air emissions. Pre- and post-remediation testing of the initial volume of PFAS-contaminated soil was completed. A general description of the facility, a summary of the 2018 test trial, and a summary of the 2019 compliance source test and commercial operations soil remediation results are provided.
https://dec.alaska.gov/media/18761/nrc-moose-creek-facility-pfas-sep-2019-case-study-v3f-191101.pdf

SOIL CONTAMINATION BY TAR IN THE ALLUVIAL SEDIMENTS: CASE STUDY OF THE BROWNFIELD REMEDIATION PROJECT IN THE CZECH REPUBLIC

Marschalko, M., P. Vicherek, M. Vicherkova, I. Yilmaz, J. Kubac, D. Popielarczyk, et al.
Environmental Earth Sciences Vol. 79 No. 52(2020)

Previous site activities contaminated alluvial soils at the former coking plant in the Czech Republic with black coal tar, PAHs, and heavy metals. About 1.5 million tons of contaminated soils within three contaminated geological layers were remediated using ex situ thermal desorption. Of the 12,200 tons of contaminants removed, 67.94% were non-polar extractable substances (NPES), 12.25% was benzene, 11.27% was naphthalene, 1.11% was PAHs, 1.11% was benzo(a)pyrene, 0.82% was phenol, 0.16% was arsenic, and and 0.02% was mercury. Thermal desorption contributed to the removal of 90.65% of NPES, while the remainder required offsite disposal.

FOURTH FIVE-YEAR REVIEW REPORT FOR CROSSLEY FARM SUPERFUND SITE BERKS COUNTY, PENNSYLVANIA

EPA Region 3, 74 pp, 2019

Former hazardous waste disposal at the 209-acre Crossley Farm site contaminated groundwater with PCE and TCE that migrated downgradient into residential wells. The site consists of three operable units (OUs)-point-of-entry treatment (POET) for residential drinking water wells (OU1), groundwater (OU2), and vapor intrusion (VI) of residential houses on top of the plumes (OU3). OU1 currently consists of 49 POET systems to remediate TCE in impacted homes. OU2 consists of the Hotspot Plume (>100,000 µg/L), Valley Plume (>1,000 µg/L), and Extended or Disdal Plume. Currently, the system is treating the Valley Plume using air stripping and a liquid phase carbon absorption and bag filtration polishing treatment to remove contamination. The system also includes a tank vapor emissions control system to treat vapor emissions from the influent tank. TCE in the combined influent measured 2,100 µg/L in 2012 at system startup but decreased to 100 µg/L in October 2018 and has removed as estimated 395 lbs of TCE and 42 lbs of PCE. To mitigate VI in OU3, vapor mitigation systems were installed at 18 residences that overlie the site-related groundwater contamination plume. EPA is currently performing the remedial design for the OU2 Hot Spot Area and has begun investigating the Extended or Disdal Plume. https://semspub.epa.gov/work/03/2282863.pdf

MONTROSE AND DEL AMO SUPERFUND SITES GROUNDWATER TREATMENT PLAN UPDATE

EPA Region 9, 6 pp, 2020

The Dual Site Groundwater operable unit (OU) is shared by both the Montrose Chemical Corporation Superfund site and Del Amo Superfund site, which have both contributed contamination into one of three plumes in the OU. The OU consists of a plume primarily contaminated with chlorobenzene from the Montrose property, a plume primarily contaminated with benzene from beneath the Del Amo property, and a plume primarily contaminated with TCE from other companies north of the former Montrose property. EPA decided that achieving maximum contaminant levels was technically impracticable in a portion of the plumes, so a technical impracticality waiver zone (TI Zone) was established. Under EPA oversight, Montrose built a groundwater treatment system to prevent polluted groundwater from migrating out of the TI Zone. The system also remediates groundwater outside the TI Zone to federal and state drinking water standards. The system utilizes advanced oxidation, air stripping, granular activated carbon filters, and ultrafiltration and dissolved oxygen removal systems before reinjection into the subsurface. Since operating continuously at a low pumping rate, the system has met or exceeded all treatment standards and has removed over 7,000 lbs of contaminants. https://semspub.epa.gov/work/09/100018256.pdf *See the five year review for more information:* https://semspub.epa.gov/work/09/1154452.pdf

Demonstrations / Feasibility Studies

SIX PILOT-SCALE STUDIES EVALUATING THE IN SITU TREATMENT OF PFAS IN GROUNDWATER

McGregor, R. | Remediation 30(3):39-50(2020)

Results are presented for six 18-month field studies conducted in a contaminated unconfined sand aquifer to determine if hydrogen peroxide (H_2O_2), sodium persulfate ($Na_2S_2O_8$), powdered activated carbon (PAC), colloidal activated carbon (CAC), an ion-exchange resin (IER), or biochar attenuate dissolved-phase PFAS in the presence of petroleum hydrocarbons. Reagents were injected using direct push technology in six permeable reactive zone (PRZ) configurations. Groundwater concentrations entering the PRZs were ≤24,000 µg/L PFPeA, ≤6,200 µg/L PFBA, ≤16,100 µg/L PFHxA, ≤6,080 µg/L PFHpA, ≤450 µg/L PFOA, and

≤140 µg/L PFNA.

PASSIVE SAMPLERS VS SENTINEL ORGANISMS: ONE-YEAR MONITORING OF PRIORITY AND EMERGING CONTAMINANTS IN COASTAL WATERS

Pintado-Herrera, M.G., I.J. Allan, E. Gonzalez-Mazo, and P.A. Lara-Martin.
Environmental Science & Technology 54(11):6693-6702(2020)

Silicone rubber passive samplers and caged *Ruditapes philippinarum* were deployed together to examine the suitability of these methods for determining spatial and temporal variability of priority and emerging contaminants in the Cadiz Bay in Spain. Seasonal trends observed for some compound classes were attributed to fluctuations in their sources or changes in the hydrodynamic conditions, respectively. Up to 42 out of 48 (in seawater) and 27 out of 37 (in biota) target analytes were detected. Conversely, spatiotemporal differences in the concentrations of target contaminants in clam tissues were minimal. Higher field bioaccumulation factors (log BAF>5) were found for priority substances. Silicone rubber passive samplers proved to be more sensitive than sentinel organisms for monitoring spatiotemporal changes in the dissolved aqueous concentrations of contaminants. In contrast, the latter allowed for a more realistic evaluation of the potential uptake and bioaccumulation of each compound.

POLYMERIC NANOFIBER-CARBON NANOTUBE COMPOSITE MATS AS FAST-EQUILIBRIUM PASSIVE SAMPLERS FOR POLAR ORGANIC CONTAMINANTS

Qian, J., A. Martinez, R.F. Marek, M.R. Nagorzanski, H. Zhi, E.T. Furlong, D.W. Kolpin, et al.
Environmental Science & Technology 54(11):6703-6712 (2020)

To improve the performance of polymeric electrospun nanofiber mats (ENMs) for equilibrium passive sampling applications in water, two types of multiwalled carbon nanotubes (CNTs) – with and without surface carboxyl groups – were integrated into polyacrylonitrile (PAN) and polystyrene (PS) ENMs. For 11 polar and moderately hydrophobic compounds, 90% of equilibrium uptake was achieved in under 0.8 days (Ii>90% values) in non-mixed ENM-CNT systems. Sorption capacity of ENM-CNTs was between 2- and 50-fold greater than pure polymer ENMs, with equilibrium partition coefficients ranging from 1.4 to 3.1 log units (L/kg) depending on polymer type (hydrophilic PAN or hydrophobic PS), CNT loading, and CNT type. During field deployment at Muddy Creek in North Liberty, Iowa, optimal ENM-CNTs (PAN with 20 wt% carboxylated CNTs) yielded atrazine concentrations in surface water with a 40% difference relative to analysis of a same-day grab sample. A mean percent difference of 30 (±20)% was observed when comparing ENM-CNT sampler results to grab sample data collected within one week of deployment.

APPLICATION OF FOUR MEASUREMENT TECHNIQUES TO UNDERSTAND NATURAL SOURCE ZONE DEPLETION PROCESSES AT AN LNAPL SITE

Kulkarni, P.R., C.J. Newell, D.C. King, L.J. Molofsky, and S. Garg.
Groundwater Monitoring & Remediation [Published online 7 June 2020 prior to print]

Oxygen influx (measured by the gradient method), long-term carbon dioxide efflux (measured with carbon traps), instantaneous carbon dioxide efflux (measured with dynamic closed chambers), and the heat flux from biodegradation (measured by thermal natural source zone depletion [NSZD] monitoring), were used to measure NSZD of LNAPL at a site in Southern California. The NSZD rates were compared, and their sources of variability, the extent NSZD processes occur in LNAPL within the saturated zone, and how NSZD is related to LNAPL composition change over time were evaluated.

MONTROSE SUPERFUND SITE LOS ANGELES, CALIFORNIA FINAL ELECTRICAL RESISTANCE HEATING (ERH) PILOT TEST REPORT

Montrose Chemical Corporation of California, 126 pp, 2020

A pilot test combined ERH technology with a vapor recovery (VR) and treatment system to reduce mobile DNAPL mass to the extent practicable. The system used a single power control unit, one steam condenser and cooling tower, and a VR blower. Captured vapors were treated with a steam regenerated granulated activated carbon (SRGAC) unit and polishing vapor-phase granulated activated carbon units (VGAC). All process water was treated via liquid-phase granular activated carbon prior to discharge. The VR system operated for 153 days, and 659,299 kWh were applied to the treatment volume over a total period of 132 days of heating. Based on direct measurement of accumulated DNAPL and estimates of mass captured on polish VGAC, ~26,600 lbs of total VOCs were recovered from the treatment volume during ERH heating. A total of 2,519 gals of DNAPL were recovered by the SRGAC unit. Confirmatory sampling within the pilot test treatment volume indicated an average monochlorobenzene (MCB) mass reduction of 99.86%. Site-specific data collected during the pilot will be used to support the selection of a larger scale ERH system.
https://semspub.epa.gov/work/09/100020452.pdf

Research

DESTRUCTION OF PER- AND POLYFLUOROALKYL SUBSTANCES (PFASS) IN AQUEOUS FILM-FORMING FOAM (AFFF) WITH UV-SULFITE PHOTOREDUCTIVE TREATMENT

Tenorio, R., J. Liu, X. Xiao, A. Maizel, C.P. Higgins, C.E. Schaefer, and T.J. Strathmann.
Environmental Science & Technology 54(11):6957-6967(2020)

Ultraviolet (UV) photochemical reaction of sulfite photosensitizer was applied to a diluted aqueous film-forming foam (AFFF) to characterize hydrated electron (e_{aq}^-) reactions with 15 PFAS. Reactivity varied widely, but reaction rates observed for individual PFAS in AFFF were like rates observed in single-solute experiments. Long-chain PFSAs and PFCAs were readily degraded while short-chain PFSAs and FTSs were more recalcitrant. Results indicated that while UV-sulfite treatment can effectively treat PFOS and PFOA to meet health advisory levels, remediation of the wider range of PFAS in AFFF will prove more challenging.

AIDED PHYTOREMEDIATION TO CLEAN UP DIOXINS/FURANS-AGED CONTAMINATED SOIL: CORRELATION BETWEEN MICROBIAL COMMUNITIES AND POLLUTANT DISSIPATION

Meglouli, H., J. Fontaine, A. Verdin, M. Magnin-Robert, B. Tisserant, M. Hijri, et al.
Microorganisms 7(11): 523(2019)

Microcosm experiments that combined alfalfa with arbuscular mycorrhizal fungal inoculum (*Funneliformis mosseae*), biosurfactant (rhamnolipids), dioxins/furans degrading-bacterium (*Sphingomonas wittichii* RW1) and native microbiota amendments were conducted to phytoremediate aged dioxins/furans-contaminated soil. The total dioxins/furans dissipation was estimated to 23% after six months of culture in the combined test when compared to the non-vegetated soil. Dioxin/furan dissipation resulted from soil microbial enzyme activity simulation and an increase of bacterial abundance, richness, and diversity, as well as fungal diversity. Concomitant cytotoxicity and dioxins/furans concentration decreases were observed in the phytoremediated soil.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6920798/

PERFORMANCE OF BUTYL RUBBER-BASED MACROPOROUS SORBENTS AS PASSIVE SAMPLERS

Tureyen, O.E., A. Yilmaz, S.D. Yakan, B. Yetiskin, O. Okay, and O.S. Okay.
Environmental Science and Pollution Research [Published online 28 April 2020 prior to print]

Macroporous butyl rubber (BR)-based sorbents, prepared in benzene (H-BR) or cyclohexane (L-BR) and synthesized by cryogelation, were compared with polydimethylsiloxane (PDMS) as passive sampler materials to investigate PAH short-term absorption rates and their long-term accumulation capacities. The H-BR samplers had the highest PAH absorption capacity for all PAHs, so benzene than cyclohexane was selected as the organic solvent for further studies in the preparation of butyl rubber-based samplers.

BIOACCUMULATION IN FUNCTIONALLY DIFFERENT SPECIES: ONGOING INPUT OF PCBS WITH SEDIMENT DEPOSITION TO ACTIVATED CARBON REMEDIATED BED SEDIMENTS

Gidley, P.T., A.J. Kennedy, G.R. Lotufo, A.H. Wooley, N.L. Melby, U. Ghosh, et al.
Environmental Toxicology and Chemistry 38(10):2326-2336

Mesocosm experiments were conducted for 90 days to evaluate the effect of activated carbon (AC) addition on PCB bioaccumulation in sandworms (*Alitta virens*), hard clams (*Mercenaria mercenaria*), and sheepshead minnows (*Cyprinodon variegatus*) in native, field-aged PCB-contaminated bed sediments. PCB-contaminated and clean sediment inputs were added three times per week to the water column. An AC dose equal to the native organic carbon content was mixed into sediment one month before testing. Worms that remained in and directly ingested the sediment had the highest bioaccumulation of native PCBs and fish exposed to the water column had the highest bioaccumulation of input PCBs. Though activated carbon amendment effectively remediated native PCBs despite inputs, it had minimal effect on the input-associated PCBs.

A NOVEL EX-SITU BIO-REMEDIATION PROCESS FOR PERCHLORATE CONTAMINATED SOIL

Nair, R.R., J.G. Russel, S. Pradeep, S.V. Ajay, and B. Krishnakumar.
Chemosphere 247:125947(2020)

A novel, ex-situ remediation process that washes perchlorate-contaminated soil with water and treats the wash water in a bioreactor was tested in a lab-scale unit continuously for three months. The bioreactor was inoculated with a perchlorate-reducing microbial consortium of *Serratia marcescens*, *Bacillus pumilus*, and *Micrococcus sp* supported by glucose (glucose/perchlorate ratio=5) and trace mineral solution. The system reused treated water for the next batch of sediment. Three washing cycles effectively removed the 2.5 g perchlorate spiked in 670 kg soil; it took 6.3 h and consumed ~360 L water. The pooled wash water containing 8.5 mg/L perchlorate was treated in the bioreactor operated at a 4.5 h hydraulic retention time and -200 mV oxidation-reduction potential.

A NUMERICAL MODEL TO OPTIMIZE LNAPL REMEDIATION BY MULTI-PHASE EXTRACTION

Qi, S., J. Luo, D. O'Connor, Y. Wang, and D. Hou
Science of the Total Environment 718: 137309(2020)

A numerical model was developed to optimize LNAPL mass removal by multi-phase extraction (MPE). After the model was validated with field data, the results, using benzene as the contaminant of concern, showed that the optimum contaminant extraction rate varied with the LNAPL thickness and submerged pump position. A cost analysis indicated that MPE technology was more cost-effective than an alternative chemical oxidation approach when the initial thickness of LNAPL was relatively thin.

VAPOR INTRUSION RISK EVALUATION USING AUTOMATED CONTINUOUS CHEMICAL AND PHYSICAL PARAMETER MONITORING

Kram, M., B. Hartman, C. Frescura, P. Negrao, and D. Egelton.
Remediation 30(3):65-74(2020)

Vapor intrusion reasonable maximum exposure (RME)-based risks were successfully and efficiently determined using continuous monitoring of concentration and parameters indicating upward advective chemical flux. Time-series analyses from multiple selected 8- and 24-hr time increments during upward advective TCE flux conditions were performed to simulate results expected from the most commonly employed sampling methods. Findings indicated that although most of the selected time increments overlap within the same 24-hr window, results and conclusions vary.

IMPACT OF PEROXYMONOCARBONATE ON THE TRANSFORMATION OF ORGANIC CONTAMINANTS DURING HYDROGEN PEROXIDE IN SITU CHEMICAL OXIDATION

Yang, X., Y. Duan, J. Wang, H. Wang, H. Liu, and D. Sedlak.
Environmental Science & Technology Letters 6(12):781-786(2019)

Carbon-13 nuclear magnetic resonance analysis showed that peroxymonocarbonate (HCO_4^-) is a potentially important oxidative species generated during H_2O_2 in situ chemical oxidation, HCO_4^- reacts with phenols to produce di- and trihydroxyl phenols. Exchanging an electron-donating substituent in the para position of a phenolic compound with an electron-withdrawing group decreased the reaction rate. Under conditions in which HO· formation is inefficient, the fraction of the phenolic compounds that is transformed by HCO_4^- could be similar to or greater than the fraction

transformed by HO·. It may be possible to adjust treatment conditions to enhance the formation of HCO_4^- as a means of accelerating rates of contaminant removal.

A GLOBAL ATMOSPHERIC CHEMISTRY MODEL FOR THE FATE AND TRANSPORT OF PFCAS AND THEIR PRECURSORS

Thackray, C.P., N.E. Selin, and C.J. Young.
Environmental Science Processes & Impacts 22, 285(2020)

Results are presented from simulations of atmospheric PFCA formation and fate using GEOS-Chem. The simulations use the most up-to-date chemistry available for the degradation of precursors and deposition and transport of the precursors, intermediates, and end-products. Ratios of long-chain to short-chain PFCAs increased strongly with distance from source regions. The model captured the observed relationship between rainwater abundance and PFCA chain length, as well as the average deposition rates at mid-latitude and Arctic sites, but underestimated the deposition of PFDoA, PFDA, and TFA at mid-latitudes and PFNA at the Devon Ice Cap. Atmospheric sources of PFCAs were estimated at 6-185 tonnes per year globally and 0.1-2.1 tonnes per year to the Arctic.
https://pubs.rsc.org/en/content/articlepdf/2020/em/c9em00326f?page=search

General News

EX SITU DETERMINATION OF FREELY DISSOLVED CONCENTRATIONS OF HYDROPHOBIC ORGANIC CHEMICALS IN SEDIMENTS AND SOILS: BASIS FOR INTERPRETING TOXICITY AND ASSESSING BIOAVAILABILITY, RISKS AND REMEDIATION NECESSITY

Jonker, M.T.O., R.M. Burgess, U. Ghosh, P.M. Gschwend, S.E. Hale, R. Lohmann, et al.
Nature Protocols 151800-1828(2020)

A passive sampling protocol was developed to determine the freely dissolved concentration (C_{free}) of hydrophobic organic chemicals in sediment and soil samples. The protocol describes the selection and preconditioning of the passive sampling polymer, critical incubation system component dimensions, equilibration and equilibrium condition confirmation, quantitative sampler extraction, quality assurance/control issues, and final calculations of C_{free}. The full procedure requires several weeks, depending on the sampler used, due to prolonged equilibration times. However, hands-on time, excluding chemical analysis, is approximately three days for a set of ~15 replicated samples.

ADVANCES IN THE TREATMENT OF 1,4-DIOXANE IN MIXED CONTAMINANT PLUMES

Rittman, B.E. and J. Blotevogel | SERDP & ESTCP Webinar Series, Webinar #114, June 2020

In this SERDP and ESTCP webinar, two projects were presented to remediate groundwater contaminated with 1,4-dioxane mixed with other contaminants. Two technologies were used: linked membrane reactors; and coupled electrochemical treatment and biological oxidation. The projects demonstrated effective reduction of 1,4-dioxane, 1,1,1-TCA, TCE, and/or other chlorinated solvents.
https://www.serdp-estcp.org/Tools-and-Training/Webinar-Series/06-18-2020

NAVAL FACILITIES ENGINEERING COMMAND 2020 REMEDIATION INNOVATIVE TECHNOLOGY SEMINAR (RITS)

NAVFAC Online Webinar Series, June 10-July 1, 2020

RITS is NAVFAC's showcase for the latest environmental restoration technologies, methodologies, and guidance news. The seminar was developed for Navy remedial project managers to share the latest innovations and best practices. Others eligible to attend include DoD personnel, federal/state/local regulators, and contractors with an active Department of Navy ER contract. The topics include:

1. Advances in Molecular Diagnostic Tools for Bioremediation and Monitored Natural Attenuation
2. Strategies for Achieving Response Complete in 2021 and Beyond
3. Assessing the Persistence and Behavior of Plumes with the REMChlor-MD Model
4. Challenges and Strategies for Developing Ecological Risk Assessments
5. Vapor Intrusion Mitigation - Design and Performance Monitoring
6. Phytoremediation - State of the Practice and New Advances

Registration is available at
https://www.navfac.navy.mil/navfac_worldwide/specialty_centers/exwc/products_and_services/ev/go_erb/training/rits.htm

THEMED ISSUE ON PER- AND POLYFLOUROALKYL SUBSTANCES

Environmental Science: Process and Impacts 21:1797-1990(2019)

The Royal Society of Chemistry generated a themed issue that focuses on PFAS. The topics covered by the issue include sources, merging analytical methods for addressing the number and diversity of PFAS, fate, and transport, bioaccumulation in wildlife, human exposure pathways, effects, regulation, and treatment technologies. *The introduction is available at* https://pubs.rsc.org/en/content/articlehtml/2019/em/c9em90047k

PERSPECTIVES OF GENETICALLY ENGINEERED MICROBES FOR GROUNDWATER BIOREMEDIATION

Janssen, D.B. and G. Stucki
Environmental Science Processes & Impacts 22:487(2020)

Major technical and scientific issues of implementing genetically engineered microorganisms are illustrated in two examples: successful 1,2-DCE remediation using pump-and-treat biotreatment processes; and 1,2,3-TCP, for which protein and genetic engineering yielded effective bacterial cultures that still await application.
https://pubs.rsc.org/en/content/articlepdf/2020/em/c9em00601j?page=search

AEROBIC BACTERIAL TRANSFORMATION AND BIODEGRADATION OF DIOXINS: A REVIEW
Saibu, S., S.A. Adebusoye, and G.O. Oyetibo.
Bioresources and Bioprocessing 7:7(2020)

This paper reviews the previous decades and recent developments on bacterial diversity and aerobic bacterial transformation, degradation, and bioremediation of dioxins in contaminated systems.
https://link.springer.com/content/pdf/10.1186/s40643-020-0294-0.pdf

PASSIVE AND GRAB SAMPLING METHODS TO ASSESS PESTICIDE RESIDUES IN WATER. A REVIEW
Valenzuela, E.F., H.C. Menezes, and Z.L. Cardeal.
Environmental Chemistry Letters [Published online 1 April 2020 prior to print]

The main passive sampling devices used for the extraction of pesticides in waters are reviewed.

APPLICATION STATUS OF VERTICAL BARRIER TECHNOLOGY IN SITE CONTAMINATION REMEDIATION
Kui, H. and L. Xiangping.
IOP Conference Series: Earth and Environmental Science 242:052029(2019)

This publication reviews the application status of vertical barrier technology at contaminated sites. Current research progress generally pays more attention to barrier materials, barrier mechanisms, and site types.
https://iopscience.iop.org/article/10.1088/1755-1315/242/5/052029/pdf

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

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