

Technology Innovation News Survey

Entries for April 16-30, 2020

Market/Commercialization Information

SMALL AND LARGE BUSINESS EVENT: EPA REGION 6 ENVIRONMENTAL OUTREACH VIRTUAL INDUSTRY DAY 2020
U.S. EPA Region 6 (Funding Office) Dallas, Texas.
Contract Opportunities on Beta.Sam.gov, Solicitation EPA_R6_Virtual_Industry_Day_2020

The U.S. EPA Region 6 Contracting Office's Virtual Industry Day is a free online session held to provide an overview of the Agency's upcoming contracting opportunities. The event is scheduled for Wednesday, June 24, from 10:00 AM - 1:00 PM CT. Only a limited number of virtual seats are available and registration at <https://www.surveymonkey.com/r/RSV8301> closes on June 15, 2020. Those who register via the registration link are automatically confirmed for the event. <https://beta.sam.gov/opp/65139563a344725b4b2a727304fc476/view>

AE SERVICES IDIQ RECOMPETE

OSMRE Western Region Federal Reclamation Program, Denver, CO
Contract Opportunities on Beta.Sam.gov, Solicitation 14050320R0002, 2020

This REQUEST FOR SF330 PACKAGES ONLY is unrestricted and open to all businesses regardless of size under NAICS code 541330, small business size standard \$16.5M. The Office of Surface Mining Reclamation and Enforcement's (OSMRE) Western Region Federal Reclamation Program requires the services of a geotechnical engineering firm located within 45 miles of Seattle, Washington, to support OSMRE's Abandoned Mine Land (AML) Program for the reclamation of AML features related to historic coal mining in Washington, California, Oregon, Arizona, South Dakota, and Idaho, as well as on Reservation Lands. Monitor Fedconnect for updates at <https://www.fedconnect.gov/FedConnect/240c7e14f65337880078agency=DOL>. A single IDIQ contract is anticipated. SF330 packages are due by 2:00 PM MT on June 18, 2020. <https://beta.sam.gov/opp/h95a56af6914d0d2b691bb845146d370/view>

ALASKA - SYSTEMS O&M AND REMEDIATION

Defense Logistics Agency (DLA) Energy, Fort Belvoir, VA.
Contract Opportunities on Beta.Sam.gov, Solicitation SPE603-20-R-0509, 2020

This procurement is 100% set aside for small business under NAICS code 541620, size standard 700 employees [NOTE: The beta.sam.tech also specifies NAICS code 562910.1]. DLA-Energy is issuing this RFP for performance of environmental remediation services at two sites in Alaska. The requirements for Eielson AFB include O&M of a remedial system at Moose Creek and environmental assessment and remediation services, including those for a pipeline that extends from the Flint Hills refinery in North Pole to Eielson AFB. The requirements for former Defense Fuel Supply Point Whittier include groundwater sampling and O&M of the remediation system. Period of performance is a 4-year base. Proposals are due by 1:00 PM ET on June 22, 2020. <https://beta.sam.gov/opp/4c8278e56f40c2ebd876f627823274/view>

ENVIRONMENTAL REMEDIATION SUPPORT SERVICES

Federal Aviation Administration, 692M15 Acquisition & Grants, AAQ600, Atlantic City, NJ.
Contract Opportunities on Beta.Sam.gov, Solicitation 692M15-19-R-00005, 2020

This solicitation is for an unrestricted best-value competitive procurement, NAICS code 562910 (Environmental Remediation Services), small business size standard 750 employees. The Federal Aviation Administration (FAA) has a requirement for environmental remediation support services at the William J. Hughes Technical Center (WJTC) campus located at Atlantic City International Airport, Pomona, New Jersey. Contractor shall provide the personnel and corporate resources to perform the required action construction, and GIS/GPS-related tasks for the WJTC, which is listed on the Superfund National Priorities List. Most of the work will be in areas of concern undergoing active remediation. The FAA plans to award one IDIQ hybrid fixed-price and time-and-materials contract with a 10-year period of performance. The SOW appendices are too large to be attached to the beta.sam posting; they will be provided to all offerors that move to Phase II of the procurement. Offers are due by 5:00 PM ET on June 24, 2020. <https://beta.sam.gov/opp/d78c566c8b6c2d25b55d5177d0ad3d8/view>

CALIFORNIA ENVIRONMENTAL SERVICES- DFSP NORWALK; DFSP OZOL; AND DFSP SAN PEDRO (PARTIAL SB SET ASIDE)

Defense Logistics Agency (DLA) Installation Management for Energy, Fort Belvoir, VA.
Contract Opportunities on Beta.Sam.gov, Solicitation SPE60320R0515, 2020

Site closure is the primary goal of this effort while restoring and maintaining the three facilities in a cost-effective manner. The requirements at DFSP OZOL are set-aside for small business, whereas the requirements at DFSP Norwalk and DFSP San Pedro are solicited on an unrestricted basis. The Government anticipates awarding three firm-fixed-price contracts, one for each location. Duration is a four-year period, plus a possible 6-month extension. The NAICS code for this procurement is 562910. Offers are due by 3:00 PM ET on June 29, 2020. <https://beta.sam.gov/opp/d145d71e463a2c3a5b9afac71c0e277/view>

HOWARDS BAY REMEDIAL DREDGING

U.S. Army Corps of Engineers, Detroit District, Detroit, MI.
Contract Opportunities on Beta.Sam.gov, Solicitation W911XK20B0006, 2020

This procurement is a total small business set-aside under NAICS code 562910. The USACE Detroit District is seeking firms that have the capability to provide construction services for the FY20 Howards Bay remedial dredging project. About 52,000 CY of material are to be dredged from the federal navigation channel and placed in a Government-furnished disposal facility, and about 80,000 CY of contaminated sediment and debris are to be dredged from Howards Bay for disposal in the WI Point Landfill. Other activities include dewatering and stabilizing contaminated dredged material, confirmation sampling, air and turbidity monitoring, collecting and treating return water, capping and grading the WI Point Landfill, and placing residuals cover material. Contractor will have an estimated 240 calendar days to complete this requirement. Estimated cost of construction is between \$10M and \$25M. Offers are due by 2:00 PM ET on June 30, 2020. <https://beta.sam.gov/opp/7156a32e6e254a79d9b6a677f0980c/view>

Cleanup News

FULL-SCALE APPLICATION OF ELS® MICROEMULSION TECHNOLOGY FOR THE TREATMENT OF AN AQUIFER CONTAMINATED WITH PERCHLOROETHYLENE AND TRICHLOROETHYLENE VIA ENHANCED REDUCTIVE DECHLORINATION

Leombruni, A., F. Morlacchi, L. Collins, D. Leigh, and M. Mueller.
Italian Journal of Groundwater 434:73-80(2020)

ELS® Microemulsion Reagent (ELS) was successfully applied to remediate groundwater at a former manufacturing site in Italy contaminated with PCE (>5.5 mg/L), TCE (>2 mg/L), 1,2-DCE (>1 mg/L) and, to a lesser extent, VC and 1,2-dichloropropane. ELS is an electron donor composed of an easily fermentable organic substrate based on lecithin and designed to enhance in situ anaerobic bioremediation of aquifers contaminated by organochlorine compounds and heavy metals. The use of ELS required turning off or adjusting, some of the pump-and-treat wells used to control source contamination due to concerns that the system could affect ELS treatment effectiveness. Approximately 4,900 kg of ELS concentration was injected under high pressure at 51 locations into the source area. In ~12 months, contaminant concentrations rapidly reduced when compared to the pre-treatment concentrations. Results indicated the establishment of clear and enhanced biotic reducing conditions. No rebound effects have been observed in three years of monitoring. <https://www.aquasolterrance.net/index.php/aquacore/download/434/365>

ASSESSMENT AND REMEDIATION OF A LIGHT NON-AQUEOUS PHASE LIQUID HYDROCARBON PLUME IN FRACTURED BEDROCK

Mitchell, I.
Journal of Environmental Solutions for Oil, Gas, and Mining 5(1):1-24(2019)

Bunker C oil was discovered on the Canadian Forces Base (CFB) Esquimalt when construction to extend an access road exposed bedrock fractures in the roadside. The LNAPL source was thought to originate from a Bunker C oil spill ~100 m uphill. Geological mapping of bedrock structural features was undertaken to assess bedrock outcrops for fracture density, fracture aperture, the orientation of primary fracture sets, and lithologic contacts. The area was also inspected for larger-scale structural features that might influence contaminant migration. Dominant preferential pathways controlling LNAPL migration at the site were identified. By superimposing these features on areas where LNAPL was observed, LNAPL delineation targets were effectively identified, and the plume was subsequently delineated with confidence and remediated.

STABILIZATION OF PFAS CONTAMINATED SOIL TWO FULL SCALE PROJECTS IN SWEDEN

Hinrichsen, H. | CRC Care International Cleanup Conference, 8-12 September, Adelaide, Australia, 18 slides, 2019

Full-scale PFAS remediation was undertaken at a former metal plating site near Hasselholm, Sweden, that contained ~3,000 tonnes of contaminated soil that no local landfill would accept. As a result, an innovative solution that involved stabilizing the soil before disposal to reduce the risk of leaching. Preliminary lab trials led to the selection of full-scale treatment, which was completed by mixing the soil with a chemical adsorbent stabilization product (3% and 5% addition rate) in the field using a Trommel screen, water truck, and a conventional loader. Two composite validation soil samples were collected from the field after treatment and sent out for leachate analysis. Results showed that the PFOS and PFFHS concentrations in soil leachate after treatment were sufficiently low to allow safe disposal to a local waste management landfill. About 3,000 tonnes of soil was treated and disposed of. The reduction in total PFAS concentrations in soil leachates after treatment ranged from 86% to 99.5%. This was the first successful full-scale stabilization of PFAS-contaminated soil in Sweden of this size. <https://rembind.com/uploads/7916-01-BemBind-Platform-Presentation-Stabilization-of-PFAS-Contaminated-Soil-Swedish-Full-Scale-Projects-Cleanup-2019.pdf>

FINAL CORRECTIVE ACTION DECISION: FORMER SCHILLING AIR FORCE BASE SITE SALINA, KANSAS

Kansas Department of Health and Environment, 68pp, 2019

KDHE has selected in situ thermal treatment, direct groundwater recirculation (DRG), emplaced permeable reactive barriers (PRBs), and injected PRBs as part of the preferred remedy for the former Schilling AFB site. Thermal treatment will be conducted on two TCE plumes. Vapor extraction wells will be collocated among the thermal wells to remove and treated vapors using granular activated carbon prior to discharge. DRG will be implemented at OU 1 and OU 2 through ~57 extraction wells and 199 injection wells to help meet remedial goals of the site. The emplaced PRB installed at Plumes F₁ and G using using cut-and-fill trenching methods. The exact dimensions and placement of the barrier will be determined during the pre-design data acquisition activities. Injected PRBs will be installed at the leading edges of Plumes D, E, F₂, and G and will be composed of ZVI (30-35%) mixed with xanthan gum and water. The total present value cost of the total preferred remedy is \$95,210,000. https://www.kdheks.gov/remedial/Schilling_AFB/Schilling_CAD.pdf

Demonstrations / Feasibility Studies

EVALUATION OF LEGACY AND EMERGING ORGANIC CHEMICALS USING PASSIVE SAMPLING DEVICES ON THE NORTH BRANCH AU SABLE RIVER NEAR LOVELLS, MICHIGAN, JUNE 2018

Brennan, A.K. and D.A. Alvarez, USGS Scientific Investigations Report 2020-5002, 32 pp, 2020

Passive sampling was conducted on the North Branch Au Sable River to assess if organic chemical concentrations were present in quantities harmful to aquatic species and establish current baseline concentrations of organic chemicals. Semi-permeable membrane devices and polar organic chemical integrative passive samplers were used to collect information on the concentration, occurrence, transport, and fate of organic chemicals. The chemical classes investigated included pesticides (OPs, organophosphates), PCBs, polychlorinated diphenyl ethers, and PAHs. The samplers were deployed at four locations along the river in June 2018 for a total of 28 days. Though organic chemical concentrations were below almost all water-quality benchmarks, they may still pose a risk to aquatic organisms and throughout the trophic hierarchy because of low-dose additive and synergistic mixture effects, transgenerational effects, and a lack of established water-quality benchmarks for many organic chemicals. <https://pubs.usgs.gov/sir/2020/5002/sir20205002.pdf>

FINAL TWELVE MONTH POST INJECTION SAMPLING REPORT BIOREMEDIATION PILOT STUDY FOR OPERABLE UNIT 3 (OU 3) BUILDING 780 NAS JACKSONVILLE FL

Naval Facilities Engineering Command Southeast, 149 pp, 2018

Building 780 is located at the north end of OU 3 and sits atop a chlorinated solvent plume caused by a closed-loop solvent recycling facility that previously operated in the building. A soil vapor extraction (SVE) system to remove VOCs from the subsurface and a groundwater pump and treat system (GWT) operated from 2000 until 2005 when it was shut down. A 2015 remedial investigation found CVOCS (primarily chlorinated ethanes and, to a lesser extent, chlorinated ethenes, both parent and byproducts) in both shallow (5-10 ft below ground surface [bgs]) and deep (10 ft-20 ft bgs) zones. A pilot test was initiated to design and implement emulsified vegetable oil (EVO) injections and evaluate the effectiveness of enhanced reductive dechlorination. About 205 gals of neat COBuPH-Mg²⁺ pH buffer was first injected, followed by 2,173 gals of neat EOS Pro into shallow and deep injection wells. Both injections were followed by chase water to distribute the products into the aquifer uniformly. High CVOCS concentrations in two monitoring wells indicated the presence of sorbed DNAPL. Results indicate that the DNAPL should aerobically degrade as it partitions into the dissolved phase. Reductive dechlorination was effective in remediating CVOCS to daughter products. However, further conversion to non-toxic end products was limited by low pH, high contaminant concentrations, and low amounts of the fermentable organic substrate. The total amount of colloidal buffer injected was not sufficient to maintain the pH in an appropriate range for efficient conversion to non-toxic end products. https://www.navfac.navy.mil/nms/SOUTHFLAST/ACRSOJWV11F_NAS/Ann207_708410.pdf

REMOVING ARSENIC AND CO-OCCURRING CONTAMINANTS FROM DRINKING WATER BY FULL-SCALE ION EXCHANGE AND POINT-OF-USE/POINT-OF-ENTRY REVERSE OSMOSIS SYSTEMS

Chen, A.S.C., L. Wang, T.J.Sorg, and D.A.Lytle.
Water Research 172:115455(2020)

Two full-scale ion exchange (IX) systems, one point-of-entry (POE) reverse osmosis (RO) system, and nine point-of-use (POU) RO units were installed to evaluate the removal of As and several co-occurring contaminants from drinking water simultaneously. The project was performed as part of the U.S. EPA's Arsenic Treatment Demonstration Program. The IX systems, coupled with strong base anionic (SBA) resins, effectively removed As, NO₃⁻, and U to below MCLs and V and Mo to below 2 µg/L. The useful run length, as determined by either 10 mg/L (as N) NO₃⁻ or 10 µg/L As breakthrough, was ~400 bed volumes initially. However, it decreased over time likely caused by resin fouling due to the presence of natural organic matter in source waters. The use of dual resins (an acrylic SBA resin underlain by a polystyrene SBA resin) effectively removed organic matter and allowed the system to perform at its baseline level through 13 months. Arsenic and nitrate peaking occurred when the resins were not regenerated timely. RO effectively removed As, NO₃⁻, Sb, U, and V, mostly with a >99% rejection rate. The POE RO, coupled with dual plumbing and POU RO in individual homes could be used as low-cost alternatives to traditional RO treatment.

SOIL FLUSHING PILOT TEST IN A LANDFILL POLLUTED WITH LIQUID ORGANIC WASTES FROM LINDANE PRODUCTION

Santos, A., C.M. Dominguez, D. Lorenzo, R. Garcia-Cervilla, M.A. Lominchar, et al.
Heliyon 5(11):e02875(2019)

An aqueous solution containing non-ionic biodegradable surfactant (E-Mulse 3®) was injected in an alluvial layer to evaluate DNAPL at a landfill in Spain. About 5.28 m³ of an aqueous surfactant emulsion (13 g/L) was injected at a flow rate of 0.6 m³/h, and the groundwater was monitored within a 3.5 m radius test cell. The flow of the injected fluids in the subsurface was also evaluated using bromide added to the surfactant solution. Contaminant concentration, chloride, bromide and surfactant, surface tension, and conductivity were measured at the injection point and three monitoring points over time. High radial dispersion resulted in high dilution of the injected fluids. Surfactant adsorption took place between injection and the groundwater extraction. The concentration of chlorinated compounds dissolved from the soil in the surfactant aqueous phase when equilibrium was reached (about 850 mg/L) was related to the moderate average contamination of the soil in the test cell (about 1230 mg/kg). In contrast, the extraction of the free DNAPL in the altered marls layer was highly enhanced due to the addition of the surfactant. The surfactant and the contamination did not migrate from the capture zone. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6872847/pdf/main.pdf>

Research

IN SITU SEQUESTRATION OF PERFLUOROALKYL SUBSTANCES USING POLYMER-STABILIZED POWDERED ACTIVATED CARBON

Liu, C., J. Hatton, W.A. Arnold, M.F. Simcik, and K.D. Pennell.
Environmental Science & Technology [Published online 7 May 2020 prior to print]

The objective of this study was to evaluate the in situ delivery and sorptive capacity of an aqueous suspension containing powdered activated carbon (PAC) stabilized with polydiallyldimethylammonium chloride (polyDADMAC) to remove PFOA

and PFOS from water. Batch studies demonstrated adsorption of PFOA and PFOS by polyDADMAC-stabilized PAC, yielding Freundlich adsorption coefficients of 156 and 629 L/g^{1/3}, respectively. In columns packed with 40-50 mesh Ottawa sand, injection of a 100 mg/L PFOA suspension created a sorptive region that increased PFOA and PFOS retention by three orders of magnitude relative to untreated control columns, consistent with the mass of retained PAC. Experiments conducted in a heterogeneous aquifer cell further demonstrated the potential for stabilized-PAC to be an effective in situ treatment option for PFAS-impacted groundwater.

EVIDENCE OF AIR DISPERSION: HFPO-DA AND PFOA IN OHIO AND WEST VIRGINIA SURFACE WATER AND SOIL NEAR A FLUOROPOLYMER PRODUCTION FACILITY

Galloway, J.E., A.V.P. Moreno, A.B. Lindstrom, et al.
Environmental Science & Technology [Publication 27 May 2020 prior to print]

PFOA used as a fluoropolymer manufacturing aid at a fluoropolymer production facility in Parkersburg, WV, from 1951 to 2013 was replaced in 2013 with the PFAS surfactant hexafluoropropylene oxide dimer acid (HFPO-DA). In a broad-scale assessment of ongoing impacts from the plant, including dispersal of HFPO-DA, samples collected downwind and upstream from the facility showed PFOA and HFPO-DA had dispersed to surface water and soil in multiple locations as far as 30 miles from the plant.

RESEARCH BRIEF 305: ARSENIC COMPLICATES GROUNDWATER BIOREMEDIATION

National Institute of Environmental Health Sciences (NIEHS) Superfund Research Program (SRP), 2 pp, 2020

According to a new NIEHS SRP study, TCE bioremediation using *D. mccartyi* strain 195 (Dhc195) may stall when arsenic is present. Adding As(III) led to a 50% decrease in Dhc195 cell growth and significant decrease in TCE degradation. When As(V) was added, Dhc195 converted As(V) to As(III) over time. While As(V) exposure did not initially impact TCE degradation, inhibition of TCE degradation was observed after exposure for >12 days, corresponding to the conversion of As(V) to As(III) and its subsequent accumulation. Significant genetic changes in the Dhc195 bacterial community were observed in response to As(III) and As(V). In As(III)-amended cultures, 52 protein-coding genes, or transcripts, were downregulated and 278 transcripts were upregulated. In cultures amended with As(V), 33 transcripts were downregulated and 332 transcripts were upregulated. Some of the gene regulation changes were shared between As(III) and As(V), but others were specific to the different types of arsenic. With exposure to both types of arsenic, genes involved in DNA repair, replication, and translation were found at higher levels, which is consistent with promoting DNA mutations in bacteria. The researchers also observed significant changes in metabolite abundances within the Dhc195 community in response to both types of arsenic. Based on these results, engineered bioremediation strategies, such as developing ways to inhibit conversion of As(V) to As(III) or providing the TCE-dechlorinating bacterial community with additional nutrients, could promote TCE degradation at arsenic-contaminated sites.
https://tools.niehs.nih.gov/srp/1/ResearchBriets/pdfs/SRP_ResearchBrief_305_508.pdf See YouTube for video summary: <https://www.youtube.com/watch?v=KmR17YerBMM>

APPROACH FOR ASSESSING PFAS RISK TO THREATENED AND ENDANGERED SPECIES

Divine, C., J. Zedler, M. Frenchmeyer, K. Daily, E. Osborn, and P. Anderson.
SERDP Project ER18-1653, 341 pp, 2020

The primary purpose of this evaluation was to develop risk-based screening levels (RBSL) protective of threatened and endangered species that are potentially present at DoD sites. Calculating RBSLs for aquatic life, terrestrial plants, soil invertebrates, and benthic invertebrates requires acute and chronic toxicity data for individual PFAS. Calculating RBSLs for wildlife requires bioaccumulation factors and toxicity values for individual PFAS. Therefore, intermediate objectives of this evaluation include compiling appropriate toxicity and uptake data for individual PFAS and developing media and PFAS-specific bioaccumulation factors and toxicity values for wildlife.
<https://www.serdp-estcp.org/content/download/51249/504484/file/ER18-1653-20Final%20Report.pdf>

FLUORIDE-SELECTIVE ELECTRODE AS A TOOL TO EVALUATE THE DEGRADATION OF PFAS IN GROUNDWATER: A BENCH-SCALE INVESTIGATION

Stonebridge, J., R. Baldwin, N.R. Thomson, and C. Ptacek.
Groundwater Monitoring & Remediation 40(2):73-80

A study was conducted to assess the impact of groundwater matrix, oxidizing reagents, quenching agents, and sample handling procedures (filtration) on F⁻ concentration in groundwater, which can be used to independently gauge PFAS degradation. F⁻ was quantified by a fluoride-selective electrode (FSE) using matrix spike recovery, and electrode slope performance. Significant limitations of FSE need to be fully understood before it can be used to quantify the production of F⁻ resulting from the potential degradation of PFAS at field sites.

ASSESSING BENTHIC BIOACCUMULATION OF POLYCHLORINATED DIOXINS/FURANS AND POLYCHLORINATED BIPHENYLS IN THE LOWER PASSAIC RIVER (NJ, USA) BASED ON IN SITU PASSIVE

Khairi, M.A. and R. Lohmann.
Environmental Toxicology & Chemistry 39(6):1174-1185(2020)

A low-density polyethylene (LDPE) multisampler system was deployed at four locations in the Lower Passaic River to derive freely dissolved concentrations of polychlorinated dibenzo-p-dioxins/furans (PCDD/Fs) and PCBs in situ pore water versus ex situ river water. The multisampler also collected sediment and benthic species samples. Good agreement was generally observed for PCDD/F and PCB concentrations comparing in situ and ex situ approaches (within 0.30-39%). Significant linear relationships were derived between log LDPE-based and log lipid-based concentrations of PCDD/Fs and PCBs. The in situ multisampler system showed promise to derive hydrophobic organic contaminant (HOC) concentrations in porewater and river water and to predict the bioaccumulation potential of HOCs in benthic biota.

APPLICATION OF SPECTRAL INDUCED POLARIZATION FOR CHARACTERIZING SURFACTANT-ENHANCED DNAPL REMEDIATION IN LABORATORY COLUMN EXPERIMENTS

Deng, Y., X. Shi, Z. Zhang, Y. Sun, J. Wu, and J. Qian.
Journal of Contaminant Hydrology 230:103603(2020)

Spectral induced polarization (SIP) measurements were conducted on DNAPL contaminated soil in columns to quantitatively assess the ability of SIP to monitor surfactant-enhanced DNAPL remediation process. Chemical data was simultaneously collected during the remediation process to verify the results obtained by SIP. A series of column flushing experiments were conducted under different flow rates, surfactant concentrations, and fluid salinities to measure variations of the subsurface environment.

COMBINING NANOSCALE ZERO-VALENT IRON WITH ELECTROKINETIC TREATMENT FOR REMEDIATION OF CHLORINATED ETHENES AND PROMOTING BIODEGRADATION: A LONG-TERM FIELD STUDY

Czinnerova, M., O. Voloskucova, K. Markova, A. Sevcu, M. Cernik, and J. Nosek.
Water Research 175:115692(2020)

A long-term field study explored nanoscale zero-valent iron (nZVI)-driven degradation of chlorinated ethenes supported by electrokinetic (EK) treatment which positively affects nZVI longevity and migration, and its impact on indigenous bacteria. In particular, the impact of combined nZVI-EK treatment on organohalide-respiring indigenous bacteria, ethenotrophs, and methanotrophs was assessed using molecular genetic markers detecting *Dehalococcoides* spp., *Desulfotobacterium* spp., the reductive dehalogenase genes *vcrA* and *bvCA* and ethenotroph and methanotroph functional genes.

A SIMULATION STUDY OF MERCURY IMMOBILIZATION IN ESTUARY SEDIMENT MICROCOSM BY ACTIVATED CARBON/CLAY-BASED THIN-LAYER CAPPING UNDER ARTIFICIAL FLOW AND TURBATION

Ting, Y., B.-L. Ch'ng, C. Chen, M.-Y. Ou, Y.-H. Cheng, C.-J. Hsu, and H.-C. Hsi.
Science of The Total Environment 708:135068(2020)

Three thin layer caps (TLC) with different activated carbon (AC) and clay combinations were applied to Hg-contaminated estuary sediment (76.0 ± 2.6 mg-Hg/kg) under turbation conditions in a 75-day lab microcosm study.

General News

TECHNICAL REPORT IN SITU ACTIVATED CARBON CASE STUDY REVIEW

NAVFAC Engineering and Expeditionary Warfare Center, 27 pp, 2020

Activated carbon (AC)-based amendments can be applied for the in situ remediation of a wide range of organic contaminants in groundwater. These amendments combine AC for enhanced sequestration of the contaminants, along with chemical or biological additives that promote further contaminant destruction. Rapid contaminant removal and limited rebound have been reported during field applications, which suggests a potential role for the technology in addressing back diffusion from residual sources in low permeability zones. This white paper describes the types of amendments available, the contaminants treated, and provides lessons learned from DOD case studies.
https://www.navfac.navy.mil/content/dam/navfac/Speciaity%20Centers/Engineering%20and%20Expeditionary%20Warfare%20Center/Environmental/Restoration/er_pdfs/In%20Site%20Activated%20Carbon%20Final.pdf

MUNITIONS RESPONSE REMEDIAL INVESTIGATION/FEASIBILITY STUDY GUIDANCE

Naval Facilities Engineering Command EXWC, Port Huenehme, CA. Technical Report WEB-NAVFAC-EXWC-EV-1906, 208 pp, 2019

This document provides a framework for conducting a munitions response remedial investigation/feasibility study (RI/FS) for Navy and Marine Corps munitions response sites under the Defense Environmental Restoration Program. Chapters include discussions of scoping the munitions response RI/FS; terrestrial and underwater RIS; removal and treatment technologies for terrestrial and underwater munitions and explosives of concern and material potentially presenting an explosive hazard; the FS; and the RI/FS report.
https://www.navfac.navy.mil/content/dam/navfac/Speciaity%20Centers/Engineering%20and%20Expeditionary%20Warfare%20Center/Environmental/Restoration/er_pdfs/mMR-8TFS-Guidance-June-2019.pdf

TRI-SERVICE ENVIRONMENTAL RISK ASSESSMENT WORKGROUP: VAPOR INTRUSION FACT SHEETS

A series of fact sheets has been prepared by DoD's Tri-Service Environmental Risk Assessment Workgroup to update and supplement the DoD Vapor Intrusion Handbook (2009). Begun in 2017, this fact sheet series covers sampling and assessment techniques that allow for an improved understanding of VI given temporal variability and the potential for the presence of background sources of VOCs. The 2019 fact sheet update presents a matrix for selecting VI investigation technologies and ranks the various technologies to facilitate selection of an effective approach. Selection is based on the specific investigation objectives, including characterization of subsurface sources, evaluation of vadose zone vapor migration pathways, and investigation of a building's sub-slab region and interior. The following fact sheet updates have been posted:

- No 1: Rev 1: Passive Sampling for Vapor Intrusion Assessment (7 pp, Feb 2017)
- No 2: Real-Time Monitoring for Vapor Intrusion Assessment (9 pp, Feb 2017)
- No 3: High Volume Soil Gas Sampling for Vapor Intrusion Assessment (14 pp, Feb 2017)
- No 4: Use of Building Pressure Cycling in Vapor Intrusion Assessment (9 pp, Aug 2017)
- No 5: Use of Tracers, Surrogates, and Indicator Parameters in Vapor Intrusion Assessment (13 pp, Sep 2017)
- No 6: Determining the Influence of Background Sources on Indoor Air Concentrations in Vapor Intrusion Assessment (10 pp, Sep 2017)
- No 7: Matrix for Selecting Vapor Intrusion Investigation Technologies (15 pp, Jul 2019)

View the fact sheets on the DEWIX VI web page at: <https://www.dewix.osd.mil/vi/vapointrusion/>

REPEATABLE MULTILEVEL GROUNDWATER SAMPLING

Naval Facilities Engineering Command, 8 pp, 2019

Repeatable multilevel groundwater sampling (RMGS) is a tool for tracking contaminant concentration trends over time at fixed locations but at depth-discrete intervals within an aquifer. The data from RMGS methods can be integrated with other sampling results to improve the conceptual site model and the understanding of contaminant distribution in both a vertical and horizontal sense. engineered systems for RMGS have both advantages and limitations when compared to clusters of conventional wells or nested wells as summarized in this fact sheet. A case study highlights where RMGS wells were used at a former landfill site at Naval Base Kitsap Keyport to provide vertically discrete monitoring of contaminant concentrations over time.
https://www.navfac.navy.mil/content/dam/navfac/Speciaity%20Centers/Engineering%20and%20Expeditionary%20Warfare%20Center/Environmental/Restoration/er_pdfs/navfac-ev-fs-MultilevelGWsampling-092019.pdf

ENVIRONMENTAL STATISTICS

Naval Facilities Engineering Command, 12 pp, 2019

Statistical methods play a key role in all tasks concerning data collection, analysis, interpretation, and visualization. The use of statistics is ubiquitous throughout an environmental project life cycle and supports both the objective of advancing scientific understanding and the management goal of making decisions. Statistics provide the tools needed to understand the behavior and patterns of contaminants over time and space. This fact sheet provides a condensed selection and discussion of important statistical methods used for the analysis of groundwater and soil data with the aim of promoting the proper use, application, and interpretation of statistics at environmental restoration sites.
https://www.navfac.navy.mil/content/dam/navfac/Speciaity%20Centers/Engineering%20and%20Expeditionary%20Warfare%20Center/Environmental/Restoration/er_pdfs/navfac-ev-fs-ESS-092019.pdf

UNDERSTANDING AND MANAGING THE POTENTIAL BYPRODUCTS OF PFAS DESTRUCTION

Horst, J., J. McDonough, I. Ross, and E. Houtz.
Groundwater Monitoring & Remediation 40(2):17-27(2020)

This column gathers evidence from literature and looks at potential byproducts associated with commercially-available and developing treatment technologies implemented to destroy PFA or have the potential to create PFAS from their precursors.

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.