Technology Innovation News Survey

Entries for March 1-15, 2020

Market/Commercialization Information

OPTIMIZED REMEDIATION CONTRACT, JOINT BASE ELMENDORF-RICHARDSON, ALASKA

W2SN Army Engineering District Alaska, Anchorage, AK.
Contract Opportunities at Beta.SAM, Solicitation W911KB20R0006, 2020

This acquisition is issued as 100% total small business set-aside under NAICS code 562910 for award as a SATOC indefinite-delivery contract (IDC) consisting of one base year and five one-year options. Overall program capacity is $35M. The resultant IDC will have firm-fixed-price task orders. The objective of this contract is to provide environmental compliance services necessary to support U.S. Air Force and AFCEC environmental mission requirements for environmental remediation activities at Joint Base Elmendorf-Richardson (JBER), Alaska. Contractor shall undertake Environmental Remediation activities to achieve performance objectives at 76 Installation Restoration Program sites and three Military Munitions Response Program sites. The SATOC IDC tool is anticipated to support various environmental services within the USACE Alaska District and across JBER. Offers are due by 2:00 PM Alaska Time on April 27, 2020. https://beta.sam.gov/opp/16d312774fda4461ae05fbab314b9806/view

CORRECTIVE MEASURES IMPLEMENTATION FOR 8 SOLID WASTE MANAGEMENT UNIT SITES, HAWTHORNE ARMY DEPOT, NEVADA

U.S. Army Engineer District Sacramento, CA.
Contract Opportunities at Beta.SAM, Solicitation PANSPD-20-P-0000000809, 2020

This synopsis is issued for market research only to seek information for preliminary planning purposes from qualified small and other than small business concerns under NAICS code 562910. The project objective involves provision of services at Compliance Restoration and Installation Restoration Program sites by conducting the required environmental restoration services; addressing any and all environmental, explosive safety, scheduling, and regulatory issues; and assuming contractual liability and responsibility for the achievement of the performance objectives for the cleanup sites at Hawthorne Army Depot. The proposed contract will be for base period of two years followed by three one-year options. The resulting contract type is expected to be a firm-fixed-price remediation approach under a performance-based acquisition. Responses are due by 5:00 PM PT on April 27, 2020.
https://beta.sam.gov/opp/2dd85e5dd89b4073be6133467cf0f6eb/view

EPA REGION 1 EMERGENCY AND RAPID RESPONSE SERVICES (ERRS V)

U.S. EPA, Region 1 Contracting Office, Boston, MA.
Contract Opportunities at Beta.SAM, Solicitation 68HE0120R0001, 2020

This procurement is issued as a total small business set-aside. The purpose of the ERRS contract is to provide fast, responsive environmental cleanup services for release of hazardous substances and materials and petroleum products/oil for EPA Region 1, and environmental cleanup in response to natural and manmade disasters, terrorist activities, weapons of mass destruction, and chemical, biological, radiological, and nuclear incidents may also be required. Details of this procurement are available only on FedConnect at https://www.fedconnect.net/FedConnect/?doc=68HE0120R0001&agency=EPA. Offers are due by 3:00 PM ET on April 29, 2020. https://beta.sam.gov/opp/09fac0642ca84d9c8e273c1bcc082882/view

US EPA TRIBAL NATION UNDERGROUND STORAGE TANK PROGRAM SUPPORT

W075 U.S. Army Engineer District San Francisco, CA.
Contract Opportunities at Beta.SAM, Solicitation W912P720R0003, 2020

This requirement is solicited as small business set-aside competition under NAICS code 541620, size standard $16.5M. As a result of this solicitation, the Government intends to award (1) a firm-fixed-price IDIQ single-award task-order contract entitled "US EPA Tribal Nation Underground Storage Tank Program Support" and (2) an initial Task Order entitled "Navajo Nation UST Site 312 Crown Point Conoco." The single-award IDIQ will have a base period of performance of 36 months and one 24-month option period. This solicitation is issued to provide the U.S. Army Corps of Engineers San Francisco District with the capability to execute UST investigations, restoration oversight, and technical support within EPA Region 9 as described in the performance work statement. Offers are due by 12:00 noon PT on May 22, 2020. https://beta.sam.gov/opp/6ed64ef0a6fd4b89af45d2bce20b848b/view

BASE REALIGNMENT AND CLOSURE (BRAC) ENVIRONMENTAL CONSTRUCTION AND OPTIMIZATION SERVICES (BECOS)

Dept. of the Air Force, FA8903 772 ESS PK JBSA, Lackland, TX.
Contract Opportunities at Beta.SAM, 2020

The Department of the Air Force is soliciting two BECOS procurements as 8(a) set-asides. (1) The former **Galena Field Operation Location** (Solicitation FA8903-20-R-0012) lies in a remote area in the western portion of interior Alaska. Award will consist of a firm-fixed-price IDIQ contract with a ceiling of $88M.
https://beta.sam.gov/opp/1b1b271973784e7eb41bfe8dfce8ff2b/view (2) The **Southwest Region** (Solicitation FA8903-20-R-0013) covers the following region and Air Force BRAC installations, including any associated geographically separated unit locations: the former George AFB, Victorville, San Bernardino County, CA; the former March AFB, Riverside, Riverside County, CA; the former Norton AFB, San Bernardino, San Bernardino County, CA; the former Williams AFB, Mesa, Maricopa County, AZ; the former Air Force Research Laboratory Mesa, Maricopa County, AZ; and the former Ontario Air National Guard Station, Ontario, San Bernardino County, CA. Award will consist of a firm-fixed-price IDIQ contract with a ceiling of $60M.
https://beta.sam.gov/opp/14e1d52c061849ec994b9b6c3b9d4b72/view The respective performance work statements define the full range of environmental, construction, and optimization services necessary to conduct site restoration, including maintenance of established remedies and implementation of optimization and remediation activities to achieve performance objectives. Offers in both cases are due by 1:00 PM CT on May 25, 2020.

Cleanup News

RECORD OF DECISION: CPS MADISON SUPERFUND SITE OPERABLE UNITS ONE AND TWO, OLD BRIDGE TOWNSHIP, MIDDLESEX COUNTY, NEW JERSEY

U.S. EPA Region 2, 223 pp, 2019

EPA has released a Record of Decision (ROD) that addresses contamination at Operable Units (OU) 1 and 2 of the CPS Madison Superfund site. Releases of organic compounds and metals from the CPS and Madison properties resulted in VOC and 1,4-dioxane contamination in groundwater and VOC, sVOC, metals, and 1,4-dioxane contamination in soils. The selected remedy for groundwater (OU 1) involves installing and operating an in situ chemical oxidation (ISCO) permeable reactive barrier (PRB) well system. In this system, a series of closely spaced wells will be placed to form a PRB downgradient of the source areas. An oxidant will be injected through these wells into the subsurface to destroy dissolved-phase organic contaminants that pass through. An existing Interim Remedial Measure pump and treatment system will continue operation until the PRB/ISCO system is effective. It will also serve as a contingency remedy if contaminant concentrations in the barrier effluent increase over four consecutive monitoring periods. The selected remedy for soil (OU 2) is ISCO. In accessible areas, oxidant will be mixed directly into an estimated 20,000 yd^3 of soil. In inaccessible areas, oxidant will be injected into an estimated 1,500 yd^3 of soil. The total present cost of the selected groundwater and soil remedies is $22,308,000. https://semspub.epa.gov/work/02/541232.pdf

CASE STUDY: WHEN IN-SITU TECHNIQUES FAIL

French, K. | RemTech 2019: Remediation Technologies Symposium, 16-18 October, Banff, 57 slides, 2019

Soil and groundwater at a former fueling station in Canada were contaminated with petroleum hydrocarbons (PHCs). While risk management did not require remediation of the source area, they did require controlling the PHC plume to prevent continued offsite migration. Two permeable reactive barriers (PRBs) containing colloidal activated carbon and oxygen-releasing material failed to control plume migration. A Remedial Design Characterization was conducted to better understand the PHC-contaminated zones. After collecting additional site data, the material used in the second PRB was changed to Trap and Treat BOS200®. After installation, contamination decreased to below the target level, and the plume was effectively contained. https://www.esaa.org/wp-content/uploads/2019/10/19-French2.pdf

TWO NEW REMEDIATION TECHNOLOGIES FOR TREATING HIGH CONTAMINANT CONCENTRATIONS IN GROUNDWATER

Leonard, G. | REMEDy: Panceum for Contamination Areas, 25 September, Warsaw, Poland, 2019

Two in situ technologies were presented, Sulfidated Micro-scale Colloidal Zero Valent Iron (S-MicroZVI) and PetroFix®, which are used to remove high concentrations of contaminants with minimal interference in the field. S-MicroZVI is an engineered ZVI product that provides abiotic degradation, enhanced biological degradation, reduced daughter products, and shorter treatment times for source area treatment of chlorinated solvents and pesticides. PetroFix consists of micro-scale activated carbon that adsorbs petroleum hydrocarbons and related organic compounds and biologically degrades the sorbed contaminants using nitrate and sulfate as electron donors. A case study on the use of PetroFix to remediate a petroleum hydrocarbon plume in groundwater at a former bulk petroleum storage facility in South Bend, Indiana, was presented.
https://www.remedysummit.com/wp-content/uploads/2019/10/REMEDy-2019-Regenesis-slides-FINAL.pdf *For a recording of the presentation as a webinar, see*
https://regenesis.com/eur/two-new-remediation-technologies-s-microzvi-petrofix/. *More information on the South Bend, IN case study:*
https://petrofix.com/wp-content/uploads/2019/05/002-REGENESIS-Case_Study-Petro-Fix-2019-05-16-05.pdf

PETROLEUM HYDROCARBON CONTAMINATED GROUNDWATER REMEDIATION USING 21ST CENTURY TECHNOLOGY: BARUWA COMMUNITY, LAGOS STATE NIGERIA AS A CASE STUDY

Ola, S.A., O.G. Fadugba, J.A. Adekoya, J.O. Babatola, O.O. Ajayi, O.O. Ojuri and S.B. Akinde.
IOP Conf. Series: Materials Science and Engineering 640:012090(2019)

In the Baruwa community in Lagos State, Nigeria, ~350 hand-dug groundwater wells used for domestic water supply were contaminated with petroleum from a leaking underground pipeline that transverses the community. Free hydrocarbon product thickness 4 injection was applied to the groundwater in the wells. In six monitoring wells, total petroleum hydrocarbons decreased from ≤500ppm to 20, 0, 25, 6, 6, and 0.7 ppm during the 30 weeks of observation. https://iopscience.iop.org/article/10.1088/1757-899X/640/1/012090/pdf

Demonstrations / Feasibility Studies

PILOT SCALE REMOVAL OF PER- AND POLYFLUOROALKYL SUBSTANCES AND PRECURSORS FROM AFFF-IMPACTED GROUNDWATER BY GRANULAR ACTIVATED CARBON

Rodowa, A.E., D.R.U. Knappe, S.-Y.D. Chiang, D. Pohlmann, C. Varley, A. Bodour, et al.
Environmental Science: Water Research & Technology 6:1083-1094(2020)

A nine-month pilot study conducted at a military fire-fighting training area evaluated PFAS removal from groundwater contaminated with aqueous film-forming foam using two granular activated carbon (GAC) vessels in a lead-lag configuration. Breakthrough was quantified for branched and linear isomers of 15 PFASs, including PFCAs, perfluoroalkyl sulfonates, perfluoroalkyl sulfonamides, and FtSAs. A total oxidizable precursor (TOP) assay was used to provide information on precursors in the influent and quantify precursor breakthrough. An influent profile was quantified to infer the nature of the AFFFs used at the site. Breakthrough of shorter-chain PFAS and branched isomers occurred before breakthrough of longer-chain PFAS and linear isomers. The order of adsorption ability for head groups of PFAS with equal chain length was $-COO^-$<-$-SO_3^-$<-$-CH_2CH_2SO_3^-$<-$-SO_2NH$. TOP assay results further showed that precursors of PFCAs broke through GAC in addition to commonly measured PFCAs and PFSAs. Results indicated that chromatographic retention times of PFAS obtained from a single analysis of influent groundwater could be used to predict the relative order of breakthroughs for other PFASs on GAC.

ADVANCES IN THE USE OF LNAPL TRACER DYES FOR REMEDIATION CHARACTERISATION IN FRACTURED BASALT

Maxfield, K. | CRC Care International Cleanup Conference, 8-12 September, Adelaide, Australia, 17 slides, 2019

LNAPL tracer dyes were used on an 8.5 ha plume within a fractured basalt aquifer to characterize LNAPL connectivity and flow in the aquifer. The aim was to generate direct empirical evidence of pumping-induced LNAPL flow between wells, characterize fracture connectivity and LNAPL flow properties, and quantify the LNAPL capture zones of recovery wells to place additional wells to optimize plume mass removal. Three dyes were used concurrently at four LNAPL extraction wells in four sequential doses for three months.
http://adelaide2019.cleanupconference.com/wp-content/uploads/2019/09/M36b.pdf *See* ***page 162*** *for longer abstract*
https://www.crccare.com/files/dmfile/CleanUp2019Proceedings_FINAL.pdf

THE IN SITU TREATMENT OF BTEX, MTBE, AND TBA IN SALINE GROUNDWATER

McGregor, R. | Remediation 29(4): 107-116(2019)

A sequential treatment approach of in situ chemical oxidation (ISCO) and enhanced bioremediation (EBR) was evaluated in a 700-day pilot test to remediate a petroleum hydrocarbon (PHC) plume containing BTEX (≤4,584 µg/L); MTBE (55,182 µg/L); and tert-butyl alcohol (TBA, 1,880 µg/L) in a saline unconfined aquifer. About 13,826 L of unactivated persulfate solution (19.4 wet weight% $Na_2S_2O_8$) was injected into a series of wells installed within the PHC plume. Results indicated that the BTEX, MTBE, and TBA within the PHC plume were treated over time by ISCO and sulfate reduction. The mean total concentration from the three monitoring wells within the pilot-test area decreased by as much as 91% for BTEX, by 39% for MTBE and 58% for TBA over the first 50 days post-injection. Concentrations rebounded at day 61 when no persulfate was detected in groundwater. Subsequent monitoring revealed a continued decrease of BTEX, suggesting that EBR was occurring within the plume. Between Days 51 and 487, concentrations decreased an additional 84% for BTEX and 33% for MTBE compared to Day 61. The TBA concentration decreased initially but increased as the sulfate concentration decreased from MTBE degradation. Isotope analyses supported the conclusions that ISCO and EBR processes were occurring at different stages and locations within the plume over time.

SPATIALLY-DISTINCT REDOX CONDITIONS AND DEGRADATION RATES FOLLOWING FIELD-SCALE BIOAUGMENTATION FOR RDX-CONTAMINATED GROUNDWATER REMEDIATION

Michalsen, M.M., A.S. King, J.D. Istok, F.H. Crocker, M.E. Fuller, K.H. Kucharzyk, et al.
Journal of Hazardous Materials 387:121529(2020)

A recent pilot study demonstrated successful remediation of a hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX) plume by bioaugmenting groundwater with Gordonia sp. KTR9 and *Pseudomonas fluorescens* strain I-C cells. A cell transport test showed the strains were transported 13 m downgradient over one month. Abundances indicators genes (*xpl*A and *xen*B) of KTR9 and Strain I-C approached injection well cell densities at 6 m downgradient. Gene abundances (and conservative tracer) had begun to increase at 13 m downgradient at test conclusion. Subsequent in situ push-pull tests measured RDX degradation rates in the bioaugmented wells under ambient gradient conditions. Time-series monitoring of RDX, RDX endproducts, conservative tracer, *xpl*A and *xen*B gene copy numbers, and XplA and XenB protein abundance were used to assess the efficacy of bioaugmentation and to estimate the apparent first-order RDX degradation rates during each test. A collective evaluation of redox conditions, RDX end-products, varied RDX degradation kinetics, and biomarkers indicated that Strain I-C and KTR9 rapidly degraded RDX. Results showed bioaugmentation was a viable technology to accelerate RDX cleanup and may apply to other sites. Full-scale implementation considerations are discussed.

Research

INVESTIGATION OF A SUSTAINABLE APPROACH TO IN-SITU REMEDIATION OF ARSENIC IMPACTED GROUNDWATER

U.S. EPA Region 2, EPA/600/R-19/102, 59 pp, 2019

A study conducted at the Vineland Superfund site (New Jersey) examined the optimization of an in situ As immobilization technology to replace or augment an existing pump and treat system. Key processes controlling As immobilization were determined through bench-scale testing, geochemical modeling, and groundwater/aquifer characterization. Field data showed that As and Fe concentrations were reduced from levels around 1,000-15,0000 µg/L to levels as low as 10 µg/L-1,0000 µg/L, respectively. Results from this work can be used to optimize the design and operation of the full-scale system and provide guidance for the design of air sparge systems at sites with similar conditions. https://cfpub.epa.gov/si/si_public_record_Report.cfm?dirEntryId=348256&Lab=CESER

EFFECTIVENESS OF POINT-OF-USE/POINT-OF-ENTRY SYSTEMS TO REMOVE PER- AND POLYFLUOROALKYL SUBSTANCES FROM DRINKING WATER

Patterson, C., J. Burkhardt, D. Schupp, E.R. Krishnan, S. Dyment, S. Merritt, L. Zintek, et al.
AWWA Water Science 1(2):1-12(2019)

Well water supplies in the municipalities of Fountain, Security, and Widefield, Colorado, contain PFHpA, PFBS, PFHxS, PFNA, PFOA and PFOS contamination The contamination source was traced to aqueous film-forming foam use at Peterson Air Force Base and contamination exceeded the 70 µg/L combined lifetime health advisory level for PFOS and PFOA at 42 public drinking water wells, and 39 private wells in the Widefield Aquifer, affecting 80,000 residents. To assist property owners and limit the exposure to PFAS in residential drinking water systems, treatability studies were conducted on PFAS removal effectiveness of commercially available point-of-use/point-of-entry units (three reverse osmosis [RO] systems and two granular activated carbon [GAC] adsorbents). The household water systems were tested with test water containing the water quality characteristics and the six PFAS contaminants found in the Widefield Aquifer region groundwater samples. Both GAC and RO systems were shown to have the potential to remove PFAS to below detections under specific water quality conditions, PFAS concentrations, and operational conditions. However, performance will vary as these conditions vary both spatially and temporally. In addition, the long-term performance of these systems was not tested.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6650157/pdf/nihms-1531194.pdf. *More Information:*
https://www.denix.osd.mil/awards/2019secdef/environmental-restoration-installation/peterson-air-force-base-colorado/ *and* https://cfpub.epa.gov/si/si_public_record_report.cfm?Lab=NRMRL&dirEntryId=344272

CATIONIC POLYMER FOR SELECTIVE REMOVAL OF GENX AND SHORT-CHAIN PFAS FROM SURFACE WATERS AND WASTEWATERS AT NG/L LEVELS

Ateia, M., M. Arifuzzaman, S. Pellizzeri, M.F. Attia, N. Tharayil, J.N.Anker, and T. Karanfil.
Water Research 163:114874(2019)

A poly (N-[3-(dimethylamino)propyl]acrylamide, methyl chloride quaternary) hydrogel matrix (DMAPAA-Q hydrogel matrix) was used as an effective sorbent for sequestering 16 PFAS from surface water and treated wastewater at environmentally relevant concentrations (SO_4^{2-}>Cl^->NO_3^-. Hydrogel performance was maintained in six consecutive adsorption/regeneration cycles to remove PFAS.

THE DEVELOPMENT OF ANAEROBIC BIOREMEDIATION APPROACHES FOR CHLORINATED SOLVENT AND 1,4-DIOXANE CO-CONTAMINATED SITES

Cupples, A. SERDP Project ER-2712, 85 pp, 2019

The objective of this project was to determine the susceptibility of 1,4-dioxane to biodegradation over a range of redox conditions using multiple inocula sources (uncontaminated agricultural soils, river sediments, and sediments from two 1,4-dioxane contaminated sites) and electron acceptor amendments (iron/EDTA/humic acid, sulfate, and nitrate). Compound specific isotope analysis (CSIA) was used to investigate biodegradation in a subset of the microcosms. Also, DNA was extracted from microcosms exhibiting 1,4-dioxane biodegradation for microbial community analysis using 16S rRNA gene amplicon and shotgun sequencing. The study indicated that 1,4-dioxane biodegradation under anaerobic conditions is feasible. Therefore, natural attenuation of 1,4-dioxane may occur over a wider range of conditions, notably methanogenic areas where highly reducing conditions exist either naturally or as a result of enhanced reductive dechlorination. https://www.serdp-estcp.org/content/download/50677/498041/file/ER-2712%20Final%20Report.pdf

CHITOSAN-BASED SILVER NANOCOMPOSITE FOR HEXAVALENT-CHROMIUM REMOVAL FROM TANNERY INDUSTRY EFFLUENT USING A PACKED-BED REACTOR

Ekambaram, N., S. Varjani, S. Goswami, U. Singh, and T. Kapoor.
Journal of Environmental Engineering 146(6) [Published online prior to print]

Chitosan-based silver nanocomposite beads synthesized through a facile chemical precipitation method was evaluated to remove Cr(VI) from synthetic and tannery industrial effluents in a packed bed reactor. The effect of various process parameters, such as residence time (3-7 h), initial Cr(VI) concentration (10-30 mg/L), silver nanocomposite dosage (5-30 g/L), and flow rate (5-20 mL/min), was investigated using synthetic effluent. Maximum Cr(VI) removal was achieved with a residence time of 5 h, initial Cr(VI) concentration of 20 mg/L, silver nanocomposite dosage of 30 g/L, and flow rate of 5 mL/min. Results indicated that an increase in initial Cr(VI) concentration, the amount of bead, and residence time increased the efficiency of Cr(VI) removal. In contrast, an increase in the flow rate decreased sorption efficiency. The evaluated process parameters exhibited almost 90% of Cr(VI) elimination from tannery industrial effluent at a concentration of 20 mg/L in the packed bed reactor.

A BIMETALLIC FE-MN OXIDE-ACTIVATED OXONE FOR IN SITU CHEMICAL OXIDATION (ISCO) OF TRICHLOROETHYLENE IN GROUNDWATER: EFFICIENCY, SUSTAINED ACTIVITY, AND MECHANISM INVESTIGATION

Yang, X., J. Cai, X. Wang, Y. Li, Z. Wu, W.D. Wu, X.D. Chen, J. Sun, S.-P. Sun, and Z. Wang.
Environmental Science & Technology 54(6):3714-3724(2020)

Sand column tests were conducted to test bimetallic Fe-Mn oxide (BFMO) for peroxysulfate-based in situ chemical oxidation (ISCO) remediation of TCE using simulated (SGW) and actual groundwater (AGW). The sustained activity of BFMO, oxidant utilization efficiency, and postreaction characterization were investigated. Electron spin resonance (ESR) and radical scavenging tests implied that sulfate radicals ($SO_4^{\bullet-}$) and hydroxyl radicals ($HO^{\bullet}$) played major roles in degrading TCE. In contrast, singlet oxygen contributed less to TCE degradation by BFMO-activated oxone. Fast degradation and almost complete dechlorination of TCE in AGW were obtained, with reaction stoichiometry efficiencies (RSE) of ΔTCE/ΔOxone at 3-5%, much higher than those reported RSE values in H2O2-based ISCO (≤0.28%). HCO_3^- did not show an effect on TCE degradation, and the effects of natural organic matters were negligible at high oxone dosage. Postreaction characterizations displayed that the BFMO was remarkably stable with sustained activity for oxone activation after 115 days of the continuous-flow test, and is a promising catalyst for oxone-based ISCO for TCE-contaminated groundwater remediation.

COMBINING CHEMICAL OXIDATION AND BIOREMEDIATION FOR PETROLEUM POLLUTED SOIL REMEDIATION BY BC-NZVI ACTIVATED PERSULFATE

Zhang, B., Y Guo, J. Huo, H. Xie, C. Xu, and S. Liang.
Chemical Engineering Journal 382: 123055(2020)

Combined remediation by persulfate (PS) with biochar supported nano zero-valent iron (BC-nZVI) was tested to treat total petroleum hydrocarbons in soil in a 60-day lab study. The TPHs degradation underwent chemical degradation (0th-6th day) followed biodegradation (6th-60th day). During the test period, long-chain TPHs constantly degraded and transformed into short-chain molecules in the BC-nZVI/PS groups. Compared with nZVI/PS treatment, BC-nZVI/PS treatment increased soil microbial metabolic activities in the 60 days. Microbial analysis showed that the PS activation groups affected microbial abundance and structure. In BC-nZVI/PS groups, the microbial abundance recovered, and TPHs-degrading bacterium increased over 60 days.

General News

HISTORY OF USE AND POTENTIAL SOURCES 1,4-DIOXANE

Interstate Technology and Regulatory Council (ITRC). Fact Sheet, 5 pp, March 2020

This fact sheet is one of six published by ITRC to summarize the latest science and emerging technologies regarding 1,4-dioxane. It reviews the history of 1,4-dioxane manufacturing and usage and provides an overview of the potential sources of releases of 1,4-dioxane to the environment.

https://14dx-1.itrcweb.org/wp-content/uploads/2020/03/14DX-History-of-Use-and-Potential-Sources-1.pdf

ECOLOGICAL RISK ASSESSMENT APPROACHES AT PFAS-IMPACTED SITES

Sepulveda, M. and J. Conder. SERDP/ESTCP Webinar Series, Webinar #109, April 2020

SERDP and ESTCP sponsored two presentations on projects that assess ecological risk for PFAS contamination. The first, entitled *Development of PFAS Toxicity Reference Values in Amphibians for use in Ecological Risk Assessments of AFFF-Contaminated Sites*, describes a project to develop PFAS toxicity reference values for amphibians at areas contaminated by aqueous film-forming foam and PFAS mixtures. The second, entitled *Guidance for Assessing the Ecological Risks of Threatened and Endangered Species at Aqueous Film Forming Foam (AFFF)-Impacted Sites*, describes a project to develop an approach that aids DoD in assessing ecological risks from PFASs to threatened and endangered species at aqueous film-forming foam-impacted sites. The objective of this project is to produce a white paper guidance document that will provide the DoD with a strategic overview of state-of-the-practice for the ecological risk assessment at DoD AFFF sites, and specific guidance on state-of-the-science approaches to quantitatively assess and manage PFAS risks. https://www.serdp-estcp.org/Tools-and-Training/Webinar-Series/04-09-2020

FIFTY YEARS OF PCB RESEARCH: NEW APPROACHES AND DISCOVERIES AND STILL SO MUCH MORE TO LEARN

Garrigues, P (ed). Environmental Science and Pollution Research (PCB Special Issue) 27(9): 8823-8937(2020)

This special issue contains nine publications from the Tenth International PCB Workshop held in Krakow, Poland, August 27-31, 2018. The topics include advances in the synthesis and detection of PCBs and their metabolites, occurrence in various environmental matrices, and their biological effects.

SURFACTANT-ENHANCED AQUIFER REMEDIATION: MECHANISMS, INFLUENCES, LIMITATIONS AND THE COUNTERMEASURES

Huo, L., G. Liu, X. Yang, Z. Ahmad, and H. Zhong.
Chemosphere 252:126620(2020)

Surfactant-enhanced aquifer remediation (SEAR) has attracted increasing interest in recent years as a highly efficient means to remove NAPLs from aquifers. A comprehensive review of the SEAR technology was conducted based on recent research advances. The review includes an overview of the basic processes and mechanisms underlying the technology, applications of SEAR, the factors that influence the technology's performance, and recent advances in modifying SEAR to overcome the limitations.

DESTRUCTION OF PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) WITH ADVANCED REDUCTION PROCESSES (ARPS): A CRITICAL REVIEW

Cui, J., P. Gao, and Y. Deng.
Environmental Science & Technology 54(7):3752-3766(2020)

Advanced reduction processes (ARPs) are a promising method to destroy PFAS in water due to the generation of short-lived and highly reductive hydrated electrons (e_{aq}^-). This review examines the mechanisms and performance of the electrons on the reductive destruction of PFAS and the unique properties of e_{aq}^- and its generation in ARP systems, particularly ultraviolet (UV)/sulfite and UV/iodide systems. It also compares the degradation mechanisms of different PFAS chemicals. The review concludes by identifying priority research needs.

RESEARCH PROGRESS OF IN-SITU REMEDIATION OF POLLUTED SOIL AND GROUNDWATER BY ELECTROKINETIC AND PERMEABLE REACTION BARRIER

Peng, S., X. Wang, and X. Zhang.
E3S Web of Conferences: 2nd International Symposium on Architecture Research Frontiers and Ecological Environment 2019 143:2043(2020)

The combination of electrokinetic remediation and permeable reactive barriers (EK-PRB) is a new green technology to remediate organic and inorganic pollutants in soil and groundwater. The technology is convenient to install and simple to operate. It does not create secondary pollution and has broad development and application prospect. This review summarizes the latest research results on the remediation of heavy metal, organic matter, and nitrate-contaminated soil and groundwater by EK-PRB and identifies the technology's technical problems.
https://www.e3s-conferences.org/articles/e3sconf/pdf/2020/03/e3sconf_arfee2020_02043.pdf

BIO/HYDROCHAR SORBENTS FOR ENVIRONMENTAL REMEDIATION

Zhang, X., Y. Wang, J. Cai, K. Wilson, and A.F. Lee.
Energy & Environmental Materials [Published online 24 Feb 2020 prior to print]

This review discusses opportunities and challenges in creating bio/hydrochar sorbents and their nanocomposites to remediate aquatic and atmospheric environments. The sorbents' high surface areas (100-1500 m^2/g), porosity (0.25-2.5 cm^3/g), and rich surface chemistry render them ideal sorbents for pollutants such as heavy metals and organic and inorganic molecules. *This article is* ***Open Access*** *at* https://onlinelibrary.wiley.com/doi/full/10.1002/eem2.12074.

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.