Technology Innovation News Survey

Entries for July 1-15, 2021

Market/Commercialization Information

UNDERSTANDING ADVERSE EFFECTS OF PER- AND POLYFLUOROALKYL SUBSTANCES ON NONTARGET SPECIES
DoD, Engineer Research and Development Center, Funding Opportunity W81EWF-21-SOI-0025, 2021

ERDC intends to fund a project that will determine changes in transcriptomes and behavior that can be linked to PFAS exposures from both field and lab experiments. The project will also address the impact of PFAS on biodiversity in the environment using molecular genetic approaches to identify species in water and sediment samples. The project is focused on determining health effects in zebrafish and on metagenomic approaches to monitor changes in the abundance of different species in environmental samples. The ultimate goal of this effort is to develop methods that accelerate the understanding of the adverse effects of PFAS on aquatic species to inform risk assessment. A single grant award is anticipated out of total estimated program funding of $300,000. Applications are due by August 30, 2021. https://www.grants.gov/web/grants/view-opportunity.html?oppId=334545

FY22 USACE LRD VARIOUS A-E SERVICES MULTIPLE AWARD TASK ORDER CONTRACT (MATOC)
U.S. Army Corps of Engineers, Great Lakes and Ohio River Division (LRD).
Contract Opportunities at SAM.gov, Solicitations W911WN21AEAJP, W911XKAEAJP, W9123721AEAJP, W912P4AEAJP, W912P521AEAJP, W912P6AEAJP, and W912QR21AEAJP, 2021

This Sources Sought is issued as market research to gain knowledge of interested, capable, and qualified sources, including small business, 8(a), SDVOSB, HUBZone, WOSB, and large business concerns. This notice is being posted across all seven of the USACE districts within the Great Lakes and Ohio River Division (LRD), i.e., Louisville, KY, Nashville, TN, Chicago, IL, Detroit, MI, Huntington, WV, Pittsburgh, PA, and Buffalo, NY. [NOTE: Although a separate notice is posted for each USACE district, each synopsis is identical and all responses go to a single location.] LRD is preparing for a potential bill that supports the American Jobs Plan, an investment in America aiming both to create jobs and rebuild America's infrastructure. The potential value of the A-E effort for LRD is between $100M - $300M over about five years. The NAICS code is 541330, size standard $16.5M, for each of the six A-E categories listed: Design, Planning, Environmental, Geotechnical, Value Engineering, and Construction Management. A-E Environmental Services might include performing environmental studies, designs, and general support of environmental issues under RCRA, CERCLA, TSCA, CWA, and other federal programs, as well as a wide range of other work described in the notice. Respond to the appropriate notice by submitting information for the A-E categories your firm is interested in AND completing the survey attached at SAM.gov. Responses are due via email by 8:00 AM CT on August 23, 2021. Only one capabilities statement is requested from each entity. The number of MATOCs, minimum and maximum task order/contract size, and socio-economic set-asides will be determined after market research analysis.
**W911WN21AEAJP - USACE District Pittsburg - https://beta.sam.gov/opp/7d7ea32520bc4f0da838251c03f2cc68/view
**W911XKAEAJP - USACE District Detroit - https://beta.sam.gov/opp/e2016da8efa64d6aae3121a5b5c85e55/view br> **W9123721AEAJP - USACE District Huntington - https://beta.sam.gov/opp/d92e4905ec804499b2ae492fe97a91da/view
**W912P4AEAJP - USACE District Buffalo - https://beta.sam.gov/opp/de281d225546abc490bf89ad5dbb90de/view br> **W912P521AEAJP - USACE District Nashville - https://beta.sam.gov/opp/4cef473b1183489ba3ed34dac43ed142/view
**W912P6AEAJP - USACE District Chicago - https://beta.sam.gov/opp/f58d9a89b16642fbaed10f29265f147d/view
**W912QR21AEAJP - USACE District Louisville - https://beta.sam.gov/opp/04421df8ada4f26b47d065d7f5efa21/view

Cleanup News

PRELIMINARY CLOSE OUT REPORT: SPECTRON, INC. SUPERFUND SITE, ELKTON, CECIL COUNTY, MARYLAND
U.S. EPA Region 3, 10 pp, 2020

A paper mill operated at the site until 1946, followed by a solvent recovery facility between 1962 and 1988. Waste sludge containing solvents such as TCE and PCE was placed in an unlined open-air lagoon next to Little Elk Creek, which over time contaminated soil and groundwater with chlorinated VOCs and other chemicals. The former Spectron Facility owner removed the upper six inches of contaminated soil, added an asphalt cover, constructed concrete perimeter dikes around the process and storage areas, removed hot spots such as the former lagoon, and paved the remaining portion of the facility. Substantial contamination remained, and the facility was abandoned in 1988. EPA proposed the site to the NPL in 1992. EPA issued a 2004 ROD selecting the remedy for OU-1 and modified it with a 2012 ROD Amendment and a 2020 ESD. The OU-1 remedy included continued operation and maintenance of the existing stream isolation and groundwater treatment system, demolition, placement of onsite debris piles under an asphalt (or equivalent) cap, grading, in situ thermal treatment of principal threat waste, and land and groundwater use restrictions. The OU-2 remedy for bedrock groundwater selected removal and treatment of DNAPL in bedrock groundwater to the maximum extent practicable using hydrophobic sorbent socks and bailers, and also included a Technical Impracticability waiver for a portion of the bedrock groundwater source area due to the presence of DNAPL in the deep bedrock and the low permeability of the geologic formation. The OU-2 remedy for soil was accomplished with excavation, consolidation, and capping.
https://semspub.epa.gov/src/document/03/2306172

COMBINED TECHNOLOGIES TO ADDRESS TWO COMPLEX CHLORINATED HYDROCARBON SITES
Fulkerson, M., B. Collins, M. Louth, and M. Perlmutter.
Sustainable Remediation Forum (SURF) webinar, 15 December, 60 minutes, 2020

This presentation discusses the use of combined treatment technologies to optimize the removal of chlorinated VOCs at two sites in eastern North Carolina. The first site has a 180-foot deep, 51-acre PCE plume. The second site has a 60-foot deep, 50 acre, 1,1,2,2-TCA, and TCE plume. Pilot studies were conducted to evaluate the site-specific effectiveness of various technologies, and a combination of groundwater treatment technologies was implemented. Source areas were treated by mixing soil with zero-valent iron. Due to the nature and extent of contamination and variable site conditions, multiple technologies were implemented downgradient. The use of combined technologies allowed for implementation flexibility and long-term responsiveness. https://www.youtube.com/watch?v=XEXxSpr2vjg

UTILIZING REAL-TIME DATA COLLECTION TO ADAPTIVELY INSTALL A PROPANE BIOSPARGE SYSTEM TO TREAT 1,4-DIOXANE
Lorenz, A., J. Saling, and A. Villhauer. | American Institute of Professional Geologists Michigan Section Workshop, 15-17 June, virtual, 44 minutes, 2021

A data-driven adaptive approach is being implemented for the investigation and remedy design for a 1,4-dioxane plume originating from multiple sources. The plum is in weathered bedrock and within a wellhead protection area. The weathered bedrock presents a complex and dynamic environment with changing flow directions, vertical gradients, and variable transmissivity. A robust adaptive investigation and CSM development were critical to the successful implementation of the adaptive remedial strategy. Data collection completed during the installation of the biosparge network proved to be key in optimizing the final remediation system layout. Specifically, data collected during biosparge well installations indicated dynamic plume conditions, which reduced the size of the biosparge well network by nearly 50%. The investigation identified a multi-directional flow component to the plume that allowed the biosparge well transect layouts to be adaptively adjusted to account for both flow directions. These findings resulted in a significant design change that allowed for better control of the biosparge wells and a reduction in the system sparging equipment and power requirements. Adaptive installation of the biosparge system enabled real-time design optimization, reducing overall cost and improving long-term performance. This project highlights the importance of data collection during remedy implementation, as well as data discipline and decisiveness to adapt accordingly during design and future operation. https://www.youtube.com/watch?v=6kcqScCbbaQ

PFAS: ADVOCATING FOR APPROVAL OF THE BEST TREATMENT TECHNOLOGIES IN AN EVOLVING REGULATORY CLIMATE
MacDonald, S.J. and F. Wilson. | American Institute of Professional Geologists Michigan Section Workshop, 15-17 June, virtual, 42 minutes, 2021

In 2018, the Michigan PFAS Action Response Team sampled water supplies for communities, schools, childcare providers, and tribes for PFAS. Among all tested sites, two (one an elementary school) had test results exceeding EPA's Lifetime Health Advisory (LHA) level of 70 ng/L PFOA and PFOS. This case study describes the steps taken to select the best available treatment technology for the small water supply system servicing the school. A granular activated carbon (GAC) adsorption treatment system was designed to provide PFAS-free drinking water to the school. However, considering the Michigan Department of Environment, Great Lakes, and Energy's subsequent effort to develop limits for seven telomers, including levels of PFOS and PFOA, lower than the LHA, additional treatment technologies were reviewed to find one that would be even more effective than GAC. Single-use ion exchange (IX) media stood out as a more effective treatment alternative with minimal operating costs. The IX system is currently operating, and an extensive sampling program is being implemented. This presentation includes an account of the process used to obtain technology approval, current system data, and lessons learned. https://www.youtube.com/watch?v=WkdBralLtCZk

Demonstrations / Feasibility Studies

A MULTI-TRACER AND WELL-BORE FLOW PROFILE APPROACH TO DETERMINE OCCURRENCE, MOVEMENT, AND SOURCES OF PERCHLORATE IN GROUNDWATER
Wright, M.T., J.A. Izbicki, and B.C. Jurgens. | Applied Geochemistry 129:104959(2021)

This study's purpose was to determine the occurrence, movement, and sources of perchlorate in groundwater using environmental tracers coupled with discrete borehole data at a site potentially contaminated by waste disposal, industrial, and agricultural activities. Perchlorate concentrations ranged from

A NOVEL APPROACH TO CHARACTERIZE A CHLORINATED SOLVENT PLUME BENEATH AN EXTENSIVE WETLAND SYSTEM
Lepczyk, P. | American Institute of Professional Geologists Michigan Section Workshop, 15-17 June, virtual, 32 minutes, 2021

Investigative and remedial activities are being performed to address chlorinated solvent releases, and other contamination at a legacy site in Michigan used to manufacture military equipment. Groundwater in part of the site migrates toward a creek and extensive wetland system. A groundwater/surface water interface monitoring well network was established with well screens intersecting the lower portion of the aquifer, where vertical aquifer profiling demonstrated the highest concentrations of VOCs. An investigation was conducted using a membrane interface probe/hydraulic profiling tool (MiHPT utilizing Geoprobe® Direct Image® to provide HRSC to collect data adjacent to the creek and wetland system to better understand the fate and transport of VOCs. The MiHPT was mounted on an amphibious direct-push drill rig to continue characterization beneath the creek and wetland system. Findings resulted in a reinterpretation of the conceptual site model and risk management approach to demonstrate surface water protection using alternative monitoring points and/or demonstration of natural attenuation. https://www.youtube.com/watch?v=brGiPpFeNMA
Longer abstract on ***pages 14-15:*** https://mi.aipg.org/workshop/2021/AIPG%20Michigan%20Workshop%20Agenda%20June%2015%2016%2017%202021.pdf

LABORATORY AND INITIAL FIELD TESTING OF THE MIN-TRAP™ FOR TRACKING REACTIVE IRON SULFIDE MINERAL FORMATION DURING IN SITU REMEDIATION
Ulrich, S., J.M. Tilton, S. Justicia-Leon, D. Liles, R. Prigge, E. Carter, C. Divine, D. Taggart, and K. Clark. | Remediation [Published online 5 May 2021 prior to print]

A lab tank test and a field test were conducted to evaluate the capability of the Mineral Trap, or Min-Trap, to collect reactive iron minerals forming in an aquifer in a retrievable format to submit for lab analysis. The Min-Trap is a monitoring well-based sampler consisting of a nonreactive granular medium within water-permeable mesh pillows supported inside slotted PVC housing and deployed inside a monitoring well. The sampler collects direct physical evidence of reactive mineral formation in situ without collecting soil or rock core samples. Both tests confirmed that iron sulfide minerals form in the Min-Trap under sulfate-reducing conditions within several weeks. Mineralogical data obtained from Min-Traps can be applied to assess remedial objectives at several stages of the remedial program, including initial characterization, alternatives evaluation, feasibility testing, remedy optimization, and transition from active treatment to passive remedial methods. *See a video explaining the device on the project's SERDP page:* https://serdp-estcp.org/Program-Areas/Environmental-Restoration/Contaminated-Groundwater/Monitoring/ER19-5190

ENHANCED BIOSTIMULATION COUPLED WITH A DYNAMIC GROUNDWATER RECIRCULATION SYSTEM FOR CR(VI) REMOVAL FROM GROUNDWATER: A FIELD-SCALE STUDY
Song, X., Q. Wang, P. Jin, X. Chen, S. Tang, C. Wei, K. Li, X. Ding, Z. Tang, and H. Fu.
Science of The Total Environment 772:145495(2021)

Enhanced bioremediation of Cr(VI) was conducted in situ by coupling organic carbon (ethanol) with a dynamic groundwater recirculation (DGR)-based system in a field-scale study. The DGR system was applied to remove Cr(VI) from groundwater via enhanced flushing by the recirculation system and deliver the biostimulant to the heterogeneous subsurface environment, including a sand/cobble aquifer and a fractured bedrock aquifer. The combined extraction and bioreduction reduced Cr(VI) concentrations from 1,000-2,000 mg/L to below the clean-up goal of 0.1 mg/L within 52 days. The study evaluated bioremediation effectiveness and the relationship between microbial communities and geochemical parameters. Multiple-line of evidence demonstrated that introducing ethanol significantly stimulated various bacteria, including those responsible for denitrification, sulfate reduction, and Cr(VI) reduction, which contributed to establishing reducing conditions in both aquifers. Cr(VI) was removed from groundwater via combined physical removal mechanisms through the DGR system, and the bioreduction of Cr(VI) followed by precipitation. Competitive growth among Cr(VI)-reducing bacteria was induced by ethanol injection.

Research

MANAGING GHG EMISSIONS ASSOCIATED WITH NATURAL SOURCE ZONE DEPLETION AT PETROLEUM HYDROCARBON SITES
McAlexander, B.
Sustainable Remediation Forum (SURF) webinar, 17 September, 59 minutes, 2020

The first half of this presentation introduces an emissions assessment for a hypothetical petroleum site with various applied remedial technologies, including LNAPL recovery with and without product recycling, passive bioventing, and monitored natural attenuation. LNAPL recovery with product recycling and passive bioventing can decrease the emissions associated with contaminant biodegradation. Incorporating this emissions component into assessments allows quantifying the full benefit of green remedial approaches at the remedial alternatives selection stage rather than simply as best management practices. The example demonstrates that even the "greenest" remedial efforts will likely mean some unavoidable greenhouse gas emissions from contaminant biodegradation. These emissions are often quantified as natural source zone depletion at LNAPL sites and provide an opportunity for direct offsetting with site reuse. The second half of this presentation introduces a feasibility assessment of various site reuse options for this purpose, including renewable energy generation by solar and wind power, revegetation, and placement of spent calcium-rich construction materials across the land surface. https://www.youtube.com/watch?v=d06QaJPGA4c

APPLICATION OF THE DYNAMIC MERCURY CYCLING MODEL (D-MCM) TO THE SOUTH RIVER, VIRGINIA
Reed Harris, David Hutchinson, and Don Beal, 113 pp, 2020

The Dynamic Mercury Cycling Model (D-MCM) was applied to characterize Hg cycling and bioaccumulation in the South River and predict the efficacy of remedial options. The D-MCM is time-dependent and predicts concentrations and fluxes of inorganic Hg, MeHg, and elemental Hg in water, sediments, and biota. The model was applied to the South River, ~26 miles downstream from the facility site and just downstream of the confluence with the North River. The model was calibrated to data from 2006-2014, followed by a sensitivity analysis and remediation simulations. https://southriverscienceteam.org/wp-content/uploads/2020/05/DMCM-application-to-South-River-Final-report-April-2020-1.pdf
More information on the South River remediation project: https://southriverscienceteam.org/

PLASMA BASED TREATMENT PROCESSES FOR PFAS INVESTIGATION DERIVED WASTE
Holsen, T., M. Crimi, and S.M. Thagard. SERDP Project ER18-1624, 74 pp, 2020

This study investigated soil washing to remove PFAS from investigation-derived waste followed by plasma treatment to destroy PFAS in the wash solution. A 50% water and 50% methanol wash solution with 1% NaCl was found to be the most effective; however, water alone was somewhat effective. Removal was fast, taking minutes; however, kinetic limitations were largely eliminated in the experimental design. Plasma treatment of distilled wash solution destroyed >99.6% of precursors qualified by the total oxidizable precursor assay, >99% of long and short-chain PFAAs (except PFBA), and of identifiable precursors with a 10-fold dilution of the concentrated still bottoms.
https://www.serdp-estcp.org/content/download/53659/527435/file/ER18-1624%20Final%20Report.pdf

NEAR-QUANTITATIVE DEFLUORINATION OF PERFLUORINATED AND FLUOROTELOMER CARBOXYLATES AND SULFONATES WITH INTEGRATED OXIDATION AND REDUCTION
Liu, Z., M.J. Bentel, Y. Yu, C. Ren, J. Gao, V.F. Pulikkal, M. Sun, Y. Men, and J. Liu.
Environmental Science & Technology 55(10):7052-7062(2021)

Oxidation (O_X) with hydroxyl radicals (HO &midot;) was used to convert FTCAs and FTSAs to a mixture of PFCAs. The oxidative defluorination of fluorotelomers cleaved 35-95% of C-F bonds, depending on the length of the fluoroalkyl chain. Subsequent reduction with UV-sulfite achieved deep defluorination of the PFCA mixture for up to 90%. The subsequent use of HO &midot; to oxidize the H-rich residues led to the cleavage of the remaining C-F bonds. The results show the feasibility of complete defluorination of legacy PFAS pollutants and will advance both remediation technology design and water sample analysis.

ENHANCED ELECTROKINETIC REMOVAL OF HEAVY METALS FROM A CONTAMINATED LAKE SEDIMENT FOR ECOLOGICAL RISK REDUCTION
Ayyanar, A. and S. Thatikonda.
Soil and Sediment Contamination: An International Journal 30(1):12-34(2021)

Electrokinetic remediation (EKR) was performed to reduce the risk of Cd, Cu, Ni, Pb, and Zn associated with different fractions of lake sediments. Batch experiments were performed to estimate the optimal concentration of EDTA, nitric acid, and acetic acid to effectively dissolve heavy metals from sediments and minimize Fe and Al dissolution to maintain good soil health. The effect of pH on the dissolution of heavy metals with optimized concentration was studied separately. An EDTA concentration of 0.01 M enhanced heavy metal dissolution (38-88%) in the pH range of 2-12. A 0.05 M concentration of nitric acid and acetic acid enhanced the heavy metal dissolution 18-85% and 15-80%, respectively, in the pH range 2-6. Increasing pH above 6 for nitric acid and acetic acid formed metal hydroxides and carbonates, which reduced heavy metal dissolution efficiency. EKR experiments were conducted in a reactor with optimal concentrations of EDTA (0.01 M), nitric acid, and acetic acid (0.05 M) as electrolyte and sediment saturation solution for 7-21 days of treatment time. After 21 days of EKR with EDTA, an average of 46.4-78.8% of heavy metals were removed. The associated risk with Cd, Pb, Zn, and Cu was reduced from high to low, and Ni was reduced from high to medium. EKR treatment using nitric acid and acetic acid removed an average of 17.2-43.60% and 24.9-57.2%, respectively, of heavy metals; all heavy metals posed medium risk, except for Cd, which showed low risk to the environment.

ESTIMATING COSTS FOR NITRATE AND PERCHLORATE TREATMENT FOR SMALL DRINKING WATER SYSTEMS
Khera, R., P. Ransom, M. Guttridge, and T.F. Speth.
AWWA Water Science 3(2):e1224(2021)

Several new EPA models were utilized to estimate the cost of nitrate and perchlorate treatment for small drinking water systems. The least-cost option varied among the three depending on system size when comparing the three technologies for a typical set of design choices and drinking water quality conditions. The relationship varied with changes to the water quality and design factors such as, but not restricted to, influent nitrate and perchlorate concentrations, the choice of residual management options, and the presence of co-contaminants and competing ions. https://awwa.onlinelibrary.wiley.com/doi/epdf/10.1002/aws2.1224.

LONG-TERM ASSESSMENT OF 1,4-DIOXANE UPTAKE VIA DUCKWEED WITH EMPHASIS ON OPERATIONAL PARAMETERS
Osama, R., M.G. Ibrahim, A. Elreedy, and M. Fujii.
Materials Science Forum 1008:121-127(2020)

Three duckweed (Lemna Gibba) -pond continual stream (DWs) lab-scale reactors DW1], two ponds [DW2], and three ponds [DW3]) were operated at variable hydraulic retention times of 2, 4, and 6 days, respectively, to phytoremediate wastewater containing 1,4-dioxane. The removal efficiency of 1,4-dioxane, chemical oxygen demand, total organic carbon, and ammonia were high in DW3, which also had slightly higher 1,4-dioxane (56.9 ± 25%) and NH_4-N (56.9 ± 25%) removal efficiencies than in DW2 (44.8 ± 19.6% and 81.9 ± 8.6%, respectively). The average effluent pH at DW3 decreased from 8.80 to 7.45, TDS decreased from 921.5 ± 120.6 to 837.6 ± 83.6 mg/L, and dissolved oxygen increased from 3.5 ± 1.9 to 7.5 ± 3 mg/L. Eventually, DWs removed 1,4-dioxane effectively from wastewater and represent an effective, low-operation, eco-friendly, and low-maintenance technology.

PERFORMANCE EVALUATION AND NEURAL NETWORK MODELING OF TRICHLOROETHYLENE REMOVAL USING A CONTINUOUSLY OPERATED TWO-PHASE PARTITIONING BIOREACTOR
Baskaran, D., A. Sinharoy, T. Paul, K. Pakshirajan, and R. Rajamanickam.
Environmental Technology & Innovation 17:100568(2020)

The aim of this study was to evaluate the performance of a two-phase, continuous stirred tank bioreactor (CSTB) for removing TCE by *Rhodococcus opacus*. Biodegradable organic solvent (silicone oil) was added to improve the TCE removal. The effect of inlet TCE concentration in the range 0.3-3.44 g/m^3 on TCE removal was studied for continuously for 77 days. Overall, results indicated that the addition of silicone oil could efficiently improve TCE removal in a CSTB.

General News

STANDARDIZING POLYMERIC SAMPLING METHOD FOR MEASURING FREELY-DISSOLVED ORGANIC CONTAMINANTS IN SEDIMENT POREWATER
Michalsen, M., A. Kennedy, G. Lotufo, K. Kerns, A. Suess, M. Lin, M. Mills, M. Lambert, D. Reible, M. Rakowska, A. Odetayo, U. Ghosh, M. Bokare, S. Yan, and P. Gschwend. ESTCP ER-201735, 522 pp, 2020

The primary purpose of this effort was to demonstrate standardized polymeric sampler procedures to measure freely-dissolved organic contaminant concentrations (C_{free}) in sediment porewater by multiple academic- and private-sector analytical laboratories, thereby increasing commercial availability promoting wider acceptance, and increased use. Commercial and academic laboratories participated in three separate tasks to test and validate standard methods for polymeric sampling, culminating in the final task of using the standardized polymeric sampling method to measure C_{free} PAHs and PCBs in a sediment sample. This report features an example scope of work and cost estimate intended to support end-users in developing scopes and cost estimates for their sediment porewater characterization projects using polymeric samplers. https://www.serdp-estcp.org/content/download/53344/524644/file/ER-201735%20Final%20Report.pdf

SUSTAINABLE EX-SITU REMEDIATION OF CONTAMINATED SEDIMENT: A REVIEW
Zhang, Y., C. Labianca, L. Chen, S. De Gisi, M. Notarnicola, B. Guo, J. Sun, S. Ding, and L. Wang. | Environmental Pollution 287:117333(2021)

This paper critically reviews the state-of-art ex situ treatment technologies and resource utilization methods for contaminated sediment. Applying different techniques can successfully transform sediment into sustainable construction materials, such as ceramsite, supplementary cementitious materials, fill materials, paving blocks, partition blocks, ready-mixed concrete, and foamed concrete. Proper remediation technologies should be selected and designed according to the physical and chemical characteristics of sediment, without neglecting important aspects, such as cost, safety, environmental impacts, readiness level of the technology, and social acceptability. Combining different assessment methods (e.g., environmental impact assessment, cost-benefit analysis, multi-criteria decision analysis, and life cycle assessment) should be employed to comprehensively evaluate the feasibility of different sustainable remediation technologies.

PHYTOREMEDIATION ADVANCES FACT SHEET
Naval Facilities Engineering Command, 4 pp, 2021

This fact sheet focuses on recent advances in the application of phytoremediation to control contaminants in soil, groundwater, surface water, or sediments and provides examples of full-scale case studies.
https://www.navfac.navy.mil/content/dam/navfac/Specialty%20Centers/Engineering%20and%20Expeditionary%20Warfare%20Center/Environmental/Restoration/er_pdfs/p/Final%20PhytoremediationAdvances_FactSheet.pdf

HEAVY METAL WATER POLLUTION: A FRESH LOOK ABOUT HAZARDS, NOVEL AND CONVENTIONAL REMEDIATION METHODS
Zamora-Ledezma, C., D. Negrete-Bolagay, F. Figueroa, E. Zamora-Ledezma, M. Ni, F. Alexis, and V.H. Guerrero. | Environmental Technology & Innovation 22:101504(2021)

This work discusses recent and relevant findings related to the release of heavy metals, potential environmental and human health risks, and removal materials and technologies available; outlines health hazards derived from repeated exposure to heavy metals, including lead, Cd, Hg, and Ar; and provides perspectives regarding techniques used to detect heavy metals and factors that could affect contaminant removal. Advantages and drawbacks of conventional and unconventional heavy metal removal methods are critically discussed, particularly those related to adsorption, nanostructured materials, and plant-mediated remediation. Commercial products currently used to eliminate heavy metals from water are provided. The work concludes with requirements and opportunities linked to developing efficient methods for heavy metal removal, such as ones that exploit nanotechnologies.

SAMPLE COLLECTION PROCEDURES FOR RADIOCHEMICAL ANALYTES IN ENVIRONMENTAL MATRICES
Hall, K., EPA 600-R-20-247, 122 pp, 2020

The procedures described in this document are intended to provide instructions to collect environmental samples to analyze for radiological contaminants following an intentional or unintentional contamination incident or emergency. This document focuses on the Site Characterization Phase, Remediation Phase, and Final Status Survey Phase (site release) of a contamination incident. The procedures describe sample collection and are intended for use by personnel trained in radiological sampling techniques and corresponding radiation safety. It is also assumed that an initial site assessment has been performed before implementing the procedures.
https://cfpub.epa.gov/si/si_public_record_Report.cfm?dirEntryId=350579&Lab=CESER

OHM SPONGE: A VERSATILE, EFFICIENT, AND ECOFRIENDLY ENVIRONMENTAL REMEDIATION PLATFORM
Nandwana, V., S.M. Ribet, R.D. Reis, Y. Kuang, Y. More, and V.P. Dravid.
Industrial & Engineering Chemistry Research 59(23):10945-10954(2020)

An oleophilic, hydrophobic, and magnetic (OHM) sponge is an oil spill remediation solution that is economical, efficient, and ecofriendly; and may be a potentially industry-adaptable approach. The OHM sponge can selectively remove the oil from the oil/water interface, recover the oil by a simple squeezing process, and is reusable. The sponge works effectively in diverse and extreme aquatic conditions and can absorb a variety of oils and oil-based compounds. The selective absorption/desorption, recovery, high absorption capacity, and reusability under one platform open new prospects for potentially sustainable water and environmental remediation applications.

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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