

Technology Innovation News Survey

Entries for October 1-15, 2020

Market/Commercialization Information

ENVIRONMENTAL REMEDIATION SERVICES MATOC: UNRESTRICTED, VARIOUS LOCATIONS, PRIMARILY ALASKA AND PACIFIC RIM

U.S. Army Corps of Engineers (USACE), W25N ENDIST Alaska, Anchorage, AK.
Contract Opportunities at Beta.SAM, Solicitation W911KB21R0016-SS, 2020

The USACE Alaska District is conducting market research to identify firms with the capabilities to perform environmental remediation services in support of a wide range of its customers, to include the Alaska District's Formerly Used Defense Sites program, Army and Air Force environmental programs, and the environmental programs of other non-DoD customers. A multiple-award IDIQ contract is contemplated with capacity of approximately \$100M, NAICS code 562910, small business size standard 750 employees. Work executed under the new IDIQ contract(s) will primarily include investigations, studies, engineering support, remedial designs, removal and remedial actions and operations, and maintenance activities. Interested firms are encouraged to respond with a brief (3 pages) statement of capability by 2:00 PM Alaska Time on November 30, 2020. <https://beta.sam.gov/opp/c5dd225e899a44ac9df01510d50b141c/view>

IDIQ MATOC FOR ENVIRONMENTAL REMEDIATION SERVICES IN THE MOBILE DISTRICT AREA OF RESPONSIBILITY

U.S. Army Corps of Engineers (USACE), Mobile District, Mobile, AL.
Contract Opportunities at Beta.SAM, Solicitation W9127820R0060, 2020

This acquisition is set aside for small business and 8(a) entities under NAICS code 562910, size standard 750 employees. The Government aims to award seven SB contracts to share \$219M in capacity and five 8(a) SB contracts to share \$30M in capacity for environmental restoration services for the USACE South Atlantic Division, specifically for the Mobile District's Environmental Restoration Program and the Air Force's FY21 Optimized Remediation Contract initiative at seven installations within the Mobile District's area of responsibility. During an ordering period of 10 years, this multiple-award vehicle will be used to support environmental restoration activities such as long-term monitoring; site assessment; surface water, groundwater, soil and air sampling; vapor intrusion studies; remedial design; interim measures and source removal actions; soil and groundwater remediation; investigations; risk assessments; risk assessments; corrective measures studies; feasibility studies; remedy selection; public involvement; response complete and site closure. Offers are due by 2:00 PM CT on December 1, 2020. <https://beta.sam.gov/opp/8f021c0d75fa4a7d8793bb890f3c07c2/view>

CARLSBAD FIELD OFFICE TECHNICAL ASSISTANCE SERVICES PROCUREMENT

Dept. of Energy, Environmental Management Consolidated Business Center, Cincinnati, OH.
Contract Opportunities at Beta.SAM, Solicitation 89303320REM000073, 2020

This solicitation is issued as a total small business set-aside for the Carlsbad Technical Assistance Contract under NAICS code 562910 (Environmental Remediation Services), size standard 750 employees. Firm-fixed-price and/or time-and-materials task orders will be issued under this IDIQ contract to enable DOE's Carlsbad Field Office (CBFO) to support ongoing missions associated with the Waste Isolation Pilot Plant (WIPP) and the National Transuranic Program. The contract shall have a ceiling value of \$100M over an ordering period of five years. The level of support required by CBFO may not be consistent during the contract period and may increase or decrease based on program needs. Contractor personnel who provide support at WIPP and locations other than CBFO will likely need to meet differing site requirements, including physical access to nuclear facilities, health monitoring, radiological worker training, and HAZWOPER training. In addition, support provided at the other locations may require some physical effort, including walking significant distances and wearing personal protective equipment (e.g., respirators and anti-contamination clothing). Technical support may require exposure to radiation areas and conditions within the limits of a site's authorized radiological activities. Contractor support may require a limited number of personnel willing and able to obtain and/or maintain a DOE security clearance (Q or L) for review of sensitive information. Check for updates on FedConnect at <https://www.fedconnect.net/FedConnect?doc=89303320REM000073&agency=DOE> and on the DOE/EM CTAC procurement website at <https://www.emcbc.doe.gov/SEB/CBFO-TAC/>. Offers are due by 4:00 PM ET on December 14, 2020. <https://beta.sam.gov/opp/0d34ab59e1914f7fae0e8acd2e2adfae/view>

TECHNICAL ASSISTANCE TO BROWNFIELDS COMMUNITIES

U.S. Environmental Protection Agency, Funding Opportunity EPA-OLEM-OBLR-20-08, 2020

EPA announces the availability of funds and solicits applications from eligible entities (including eligible non-profit organizations) to provide technical assistance to communities on brownfield issues. See details at <https://www.epa.gov/grants/technical-assistance-brownfields-communities-0>. EPA anticipates awarding up to 11 cooperative agreement(s) out of an estimated funding total of \$11M. If a single entity is selected for multiple geographical areas, those applications may be combined into a single award with the total award exceeding \$1M. Cooperative agreements awarded will be funded incrementally. The closing date for applications is December 22, 2020. <https://www.grants.gov/web/grants/view-opportunity.html?oppId=329720>

Cleanup News

CORRECTIVE ACTION IMPLEMENTATION REPORT: NUSTAR ADOVER QUAIL CROSSING, ANDOVER, KANSAS

Apex on behalf of NuStar Pipeline Operating Partnership, L.P., 79 pp, 2020

In June 2012, separate-phase hydrocarbons (SPH) were found in a neighborhood irrigation well at levels above the federal MCLs. Initial response and abatement activities were implemented, including repairs to the pipeline, soil excavation, deactivation of the irrigation well, and SPH removal from the well. After two successful pilot studies, enhanced aerobic bioremediation (EAB) pilot studies using oxygen-releasing compounds (ORC) Advanced® was implemented to remediate groundwater. About 15,177 lbs of ORC were injected through temporary injection borings and monitoring/pilot test wells in the area of higher petroleum concentrations. Continued groundwater monitoring to evaluate petroleum concentration trends will be conducted quarterly to determine whether remediation efforts are effectively treating contamination. https://www.kdheks.gov/remediation/site_remediation/download/Nustar_CAPImplementation.pdf
To see all site documents, see https://www.kdheks.gov/remediation/site_remediation/nustar_andover.html

IN SITU DNAPL DESTRUCTION WITH THE EZVI TECHNOLOGY: LESSONS LEARNED AND RECENT ADVANCEMENTS

Booth, G. | Groundwater Resources Association Remediation Conference: Optimization of Remediation Systems and Long-Term Monitoring, 13-14 November, Santa Ana, CA, 31 slides, 2019

The presentation describes the development and implementation of emulsified zero-valent iron (EZVI) technology highlights two case studies where EZVI was used to remediate groundwater contaminated with TCE. EZVI enhancements, including controlled methanogenesis and catalyzed ZVI to optimize remediation, are discussed. <https://www.grac.org/media/files/files/45b5bdf1/booth.pdf>

PERFORMANCE OF THE WATER TREATMENT AT RANDLE REEF

Laliberte, M., M. De Ladurantaye-Noel, and D. Oliphant.
REMTECH 2020: The Remediation Technologies Symposium, 14-15 October, Virtual Meeting, abstract, 2020

The current phase of environmental rehabilitation at the Randle Reef site in Hamilton, Ontario, started in 2018 and involved dredging contaminated sediments from the harbor bottom. An advanced treatment plant is treating the water contaminated by dredging activities. The treatment plant consists of a ballasted flocculation stage followed by ACTIFLO® CARB powdered activated carbon-assisted ballasted flocculation polishing. The presentation includes the rationale for technology selection and a summary of water quality results. Results included raw water, water from the first stage, and the final treated water to show how the first and the second stages of the treatment plant complement each other. The presentation concludes with some lessons learned. *More information in the Randle Reef project:* <http://www.randlereef.ca/>
Longer abstract: <https://www.esaa.org/wp-content/uploads/2020/10/5-RT-2020.-Laliberte.pdf>

COMBINED REMEDIATION TECHNOLOGIES FOR ENHANCED IN-SITU VAPOR, SOIL AND GROUNDWATER LNAPL AND DNAPL REMEDIATION

Ivey, G. | REMEDy: Panacea for Contamination Areas, 25 September, Warsaw, Poland, 49 slides, 2019

Three remediation case studies were presented to provide details, evidence-based findings, and benefits of using surfactant enhanced extraction (SEE) as part of physical, biological, or chemical treatment train strategies. The strategies expedited vapor, soil, and groundwater remediation to achieve the applicable regulatory and/or risk assessment based cleanup objectives. The three full-scale SEE remedial efforts resulted in contaminant recovery at each site before or after a second physical, biological, or chemical remediation strategy. Based on these results, SEE as a combined 2-step remediation strategy was easy to implement and can result in significant project life-cycle cost savings to achieve regulatory or risk-based site cleanup objectives. <https://www.remedysummit.com/wp-content/uploads/2019/10/George-Bud-Ivey-Ivey-International-Inc.-REMEDy-2019.pdf>

REMEDIATION OF BROMACIL AND DICAMBA-IMPACTED GROUNDWATER

Rakewich, B. and H. Bakker.
REMTECH 2020: The Remediation Technologies Symposium, 14-15 October, Virtual Meeting, abstract, 2020

A sustainable pump and treatment system was designed for a remote site in central Alberta to recover sterlant-impacted groundwater at the downgradient edge of the plume. The water was treated onsite using granular activated carbon and re-injected into the same groundwater formation upgradient of the plume to create a preferential gradient to increase the recovery capacity. The entire system was operated using solar power. The solar-powered, closed-loop system offered a far more sustainable and economical approach than conventional recovery and deep well disposal options currently available.
Longer abstract: <https://www.esaa.org/wp-content/uploads/2020/10/6-RT-2020-Rakewich.pdf>

Demonstrations / Feasibility Studies

ASSESSING AND MODELLING THE EFFICACY OF *LEMNA PAUCICOSTATA* FOR THE PHYTOREMEDIATION OF PETROLEUM HYDROCARBONS IN CRUDE OIL-CONTAMINATED WETLANDS
Ekperusi, A.O., E.O. Nwachukwu, and F.D. Sikoki.
Scientific Reports 10:8489(2020)

Lemna paucicostata was tested on a pilot scale to treat petroleum hydrocarbons in crude oil-contaminated waters in constructed wetlands. After 120 days, *L. paucicostata* removed 97.91% of the hydrocarbons from the wetlands. Assessment of the transport and fate of hydrocarbons in duckweed indicated that *L. paucicostata* bioaccumulated less than 1% and significantly biodegraded 97.74% of hydrocarbons in wetlands at the end of the study. The experimental data reasonably fitted into the first-order kinetic rate model. *This article is Open Access at* <https://www.nature.com/articles/s41598-020-65389-z>.

PFAS TREATMENT TRIALS WITH GRANULATED ACTIVATED CARBON

Galbraith, F., D. McMillan, M. Edwards, R. Pennell, and M. Goulden.
REMTECH 2020: The Remediation Technologies Symposium, 14-15 October, Virtual Meeting, abstract, 2020

Source control treatment of surface water containing hydrocarbons, PAHs, metals, and PFAS contamination was conducted within a retention pond in the Fire Fighting Training Area of Canadian Forces Base Comox, Lazo, in British Columbia. Granulated activated carbon (GAC) and components of an existing water treatment system were used to treat PFAS-impacted surface water within the pond and from a recent spill of a newer formulation of aqueous film-forming foam at a separate base area. In addition, advanced oxidation was evaluated on samples of surface water. Results from the treatment of PFAS with GAC and advanced oxidation are presented along with considerations for improving performance and optimizing the long-term treatment of these compounds at the site. *See presentation for a description of the project and results:*
http://bceja.com/best/wp-content/uploads/2019/05/McMillan_DFB-Comox-Fire-Fighting-Training-Area.pdf
Longer abstract: <https://www.esaa.org/wp-content/uploads/2020/10/23-RT-2020-Galbraith.pdf>

MONITORING OF A LONG TERM PHYTOREMEDIATION PROCESS OF A SOIL CONTAMINATED BY HEAVY METALS AND HYDROCARBONS IN TUSCANY

Macci, C., E. Peruzzi, S. Doni, and G. Masciandaro.
Environmental Science and Pollution Research 27:424-437(2020)

Indicators of soil contamination, organic matter evolution, and biochemical processes of a long-term phytoremediation process were monitored and modeled. *Populus nigra* L., *Paulownia tomentosa* Steud., *Cytisus scoparius* L. and natural vegetation were used in the soil in areas of a site with low, medium, and high concentrations of contamination. Parameters indicating contamination (TPH and heavy metals) and agronomic (C, N, and P) and functional (enzyme activities) soil recovery were monitored for 3.5 years. Results indicated a ~52% decrease in TPH over time on the site, while the metal reduction was ~22% at surface level. A stimulation in metabolic soil processes and soil chemical quality improvement was also observed throughout the experimental site. The initial contamination level did not affect either the decontamination process or soil quality improvement, which occurred similarly in the three contaminated areas.

METHOD TO ESTIMATE THERMAL CONDUCTIVITY OF SUBSURFACE MEDIA

Askarani, K. K., Sam Gallo, A.J. Kirkman, and T.C. Sale.
Groundwater Monitoring & Remediation [Published online 29 October 2020 prior to print]

An Internet of Things (IoT) tool and a computational method were applied at a former petroleum refinery to resolve in-situ thermal conductivity values in soil-groundwater systems vertically. A line heat source was co-located with a vertical string of in-situ temperature sensors. Five-minute multiple level temperature data were collected before, during, and after a 100-minute heating period. Vertically-distributed temperature data were transformed into vertically discretized thermal conductivity values using an analytical solution. Estimated thermal conductivity values from 0.3-7.3 m below ground surface range between 0.7 and 5.4 (W/m/C), with the highest values occurring in media with higher water content.

WATER TREATMENT PLANT FINAL REPORT PLAINFIELD GAC PILOT PROJECT, GAC2018

Prein & Newhof on behalf of the Plainfield Charter Township, 80 pp, 2019

PFAS were detected in raw water from the Versluis Well Field, which supplies drinking water to the Plainfield Charter Township during peak water demands in summer months. The combined concentrations of PFOA and PFOS ranged from 4.9-10.3 ng/L. Plainfield's water treatment process was not designed to remove PFAS compounds. A pilot study was conducted to determine how effective retrofitting the existing dual media filters in the existing treatment plant with granular activated carbon (GAC) was to maintain existing water treatment standards and remove PFAS. The pilot tested three GAC filter setups: sand+Calgon F-820 and an 8.2 min empty bed contact time (EBCT), Calgon F-800 and an 8.1 min EBCT, and Calgon F-400 and a 10.1 EBCT. While the plant saw some breakthrough of PFAS compounds, the F-400 was the GAC of choice for total organic carbon and PFAS removal. On a short-term basis, it was feasible and effective for Plainfield Charter Township to address its PFAS contamination by retrofitting its existing rapid sand filters.
https://www.michigan.gov/documents/pfasresponse/Water_Treatment_Plant_Final_Report_Plainfield_GAC_Pilot_Project_GAC2018_700340_7.pdf
For the 2019-2020 water quality reports, see https://www.plainfieldmi.org/services/water/gac_filter_project.php.

Research

COMPARING PERFORMANCES, COSTS AND ENERGY BALANCE OF EX SITU REMEDIATION PROCESSES FOR PAH-CONTAMINATED MARINE SEDIMENTS

Bianco, F., G. Monteverde, M. Race, S. Papirio, and G. Esposito.
Environmental Science and Pollution Research 27:19363-19374(2020)

A comparison of performances, costs, and energy balance was conducted on the ex situ technologies anaerobic bioremediation, soil washing, and low-temperature thermal desorption (LTTD) to remove PAHs from marine sediments. Phenanthrene (PHE) was used as a model compound. After 42 days of anaerobic bioremediation, PHE biodegradation of 68% and 64% were observed under denitrifying and methanogenic conditions, respectively, accompanied by N₂ and CH₄ production and volatile fatty acid accumulation. During soil washing, >97% of PHE was removed after 60 min using a solid-to-liquid ratio of 1:3. Along the same treatment time, LTTD removed 88% of PHE at 200°C. An economic analysis indicated that LTTD resulted in a higher cost (1782 €/m³) and more energy (417 kWh/m³) than bioremediation and soil washing (228 and 371 €/m³, and 16 and 14 kWh/m³, respectively).

AQUEOUS FILM-FORMING FOAMS EXHIBIT GREATER INTERFACIAL ACTIVITY THAN PFOA, PFOS, OR FOSA

Costanza, J., L.M. Abriola, and K.D. Pennell.
Environmental Science & Technology 54(21):13590-13597(2020)

Air- and NAPL-water interfacial tension were measured on synthetic groundwater containing PFOA, PFOS, FOSA, or aqueous film-forming foam (AFFF) formulations at concentrations ranging from 0.1 to >1000 mg/L. The NAPLs tested included dodecane, PCE, and jet fuel. AFFF formulations were less efficient at lowering interfacial tension than PFOA, PFOS, or FOSA substances.

COMPARATIVE STUDY ON MULTIWAY ENHANCED BIO- AND PHYTOREMEDIATION OF AGED PETROLEUM-CONTAMINATED SOIL

Ptaszek, N., M. Pacwa-Plociniczak, M. Noszczyńska, and T. Plociniczak.
Agronomy 10(7):947(2020)

Multiway enhanced bioremediation and phytoremediation were tested on aged and highly-polluted soil (petroleum hydrocarbon [PH] content ~2.5%). In enhanced experimental groups, bioremediation and phytoremediation processes were inoculated with a *Rhodococcus erythropolis* CDEL254 endophytic strain and a *Pseudomonas aeruginosa* rhamnolipid solution to support removal. After 112 days of incubation, the highest PH removal (31.1%) was observed in soil planted with ryegrass (*Lolium perenne* L.) treated with living CDEL254 cells and the solution. The highest PH loss (26.1%) for non-planted experimental groups was detected in soil treated with heat-inactivated CDEL254 cells and the solution. The PH loss in untreated (natural attenuation) soils and soils that underwent phytoremediation with no inoculation reached a value of 14.2% and 17.4%, respectively. Even though the CDEL254 strain colonized plant tissues and showed high survival in soil, it did not significantly increase PH loss compared to systems treated with dead biomass. *This article is Open Access at* <https://www.mdpi.com/2073-4395/10/7/947>.

USE OF A NOVEL BIOPELLET TO TREAT TOTAL PETROLEUM HYDROCARBON CONTAMINATED GROUNDWATER

Yang, D.-S., and S.-T. Chen. | Water 12:2512(2020)

Biopellets made of total petroleum hydrocarbon (TPH)-acclimated microbes, fermented fruit peel materials, and CaO₂ recycled from eggshells were manufactured to treat groundwater spiked with 500 mg/L diesel TPHs (TPH_d). The biopellets provided 56 mg of oxygen, achieved a C:N:P ratio by weight of 10:4:1, and were capped with alginate to prolong its floating time in water to 25 days. After eight days, results showed a 98.8% removal of TPH_d at a 64.1 mg/L/day rate, with a microbial count that increased from nearly zero to 1.0×10⁷ CFU/mL. The residual TPH_d constituents were mainly C13-C18. Microbial consumption of N, P, and oxygen was noted during the duration of the study. As the TPH_d level increased to 1500 mg/L, the removal rate reached 45 mg/L per day, and all TPH_d was removed after 22 days. <https://www.mdpi.com/2073-4441/12/9/2512/pdf>

A NEW CONCEPT IN CONSTRUCTED WETLANDS: ASSESSMENT OF AEROBIC ELECTROCONDUCTIVE BIOFILTERS

Aguirre-Sierra, A., T. Bacchetti-De Gregoris, J.J. Salas, A. de Deus, and A. Esteve-Nunz. Environmental Science: Water Research & Technology 6:1312-1323(2020)

Two electroconductive (EC) biofilters fed with real urban wastewater were operated under downflow (aerobic) and upflow (anaerobic) conditions to evaluate the impact of the operational mode on both the removal of pollutants and the microbial community profile. Despite the aerobic nature of the downflow EC biofilter, results revealed an abundance of electroactive bacteria from the *Geobacter* genus, opening a new scenario for treating wastewater based on stimulating extracellular electron transfer. The co-presence of *Geobacter* and *Thiobacillus* suggests the existence of interspecies electron transfer leading to nitrate respiration in the system. The downflow EC biofilter outperformed the anaerobic upflow one in chemical oxygen demand, biological oxygen demand, and nitrogen removal. <https://pubs.rsc.org/en/content/articlepdf/2020/ew/c9ew00696f>

SYNTHESIS AND EVALUATION OF FE3O4-IMPREGNATED ACTIVATED CARBON FOR DIOXIN REMOVAL

Tu, Y.-J., G.S. Premachandra, S.A. Boyd, J.B. Sallach, H. Li, B.J. Teppen, and C.T. Johnston. Chemosphere 263:128263(2020)

A method was developed to create magnetic activated carbon composites (AC-Fe₃O₄) for dibenzo-p-dioxin (DD) removal and sampling that can be recovered from soils using magnetic separation. Six different composites, consisting of one of five granular ACs (GAC) and/or powdered AC (PAC), were tested using magnetic separation. Both GAC/PAC and GAC/PAC- Fe₃O₄ composites removed DD from aqueous solution. The sorption affinity of DD for GAC- Fe₃O₄ was slightly reduced compared to GAC alone, attributed to the blocking of sorption sites. GAC- Fe₃O₄ composite magnetization reached 5.38 emu/g, allowing the adsorbent to be easily separated from aqueous solution using an external magnetic field. Similarly, a fine-textured PAC- Fe₃O₄ composite was synthesized with a magnetization of 9.3 emu/g.

LEGACY AND NOVEL PER- AND POLYFLUOROALKYL SUBSTANCES IN JUVENILE SEABIRDS FROM THE U.S. ATLANTIC COAST

Robuck, A.R., M.G. Cantwell, M.G. Cantwell, J.P. McCord, L.M. Addison, M. Pfohl, et al. Environmental Science & Technology 54(20):12938-12948(2020)

Thirty-six emerging and legacy PFAS were measured in livers from 31 juvenile seabirds from Massachusetts Bay, Narragansett Bay, and the Cape Fear River Estuary (CFRE). PFOS made up 58% of concentrations observed across all habitats (11-280 ng/g). Perfluorinated ether sulfonic acid (1-110 ng/g), PFO₄DA, and PFO₅DoDA (5-30 ng/g) were confirmed in chicks hatched downstream of a fluoropolymer production site in the CFRE. PFOS was inversely associated with phospholipid content in livers from CFRE and Massachusetts Bay individuals. $\delta^{13}C$ was positively correlated with some long-chain PFAS in CFRE chick livers. Results also indicated that seabird phospholipid dynamics were negatively impacted by PFAS, which should be further explored given the importance of lipids for seabirds.

POTENTIAL USE OF FLOATING TREATMENT WETLANDS ESTABLISHED WITH *CANNA FLACCIDA* FOR REMOVING ORGANIC CONTAMINANTS FROM SURFACE WATER

Hwang, J.I., Z. Li, N. Andreacchio, F.O. Hinz, and P.C. Wilson. International Journal of Phytoremediation 22(12):1304-1312(2020)

A mesocosm study was conducted to evaluate the potential use of floating treatment wetlands (FTWs) planted with *Canna flaccida* to remove acetaminophen, carbamazepine, and one atrazine from contaminated water. Water samples were collected over 12 weeks for analysis. The FTWs showed differing abilities to remove the contaminants. Plant densities on the FTWs did not affect acetaminophen or atrazine dissipation but did affect carbamazepine dissipation. All acetaminophen residues were removed from the water within two weeks, while all atrazine residues were removed within 12 weeks. About 79-92% of these residues removed were associated with the FTWs. Only 29-36.7% of the total removed carbamazepine was associated with the FTWs.

General News

METHODS FOR DELIVERY AND DISTRIBUTION OF AMENDMENTS FOR SUBSURFACE REMEDIATION: A CRITICAL REVIEW

Muller, K.A., C.D. Johnson, C.E. Bagwell, and M.J. Truex. Groundwater Monitoring & Remediation [Published online 30 October 2020 prior to print]

A wide range of amendments, techniques, and subsurface access methods are available to deliver and widely distribute remedial amendments, but applying these approaches depends on many site-specific factors. This article provides an overview of amendments and access/distribution methods, along with a discussion of the maturity level, advantages, and limitations related to each approach's potential effectiveness in the context of site-specific factors. Each amendment and delivery approach is further evaluated for applicability to saturated, unsaturated, and perched water, focusing on high and low permeability regions in each zone. A critical need exists for field-tested approaches targeting unsaturated and perched water zones, as well as low-permeability regions within all subsurface regions.

NATURAL SOURCE ZONE DEPLETION (NSZD): WHAT IS IT AND WHERE DOES IT FIT INTO PETROLEUM NAPL SITE MANAGEMENT?

Rousseau, M. American Institute of Professional Geologists Michigan Virtual Forum, May 8, 2020

This presentation discusses the fundamentals of LNAPL biodegradation (i.e., natural source zone depletion [NSZD]), provides an overview of the most used methods to quantify it, and considers the different ways it may factor into managing petroleum-contaminated sites. Case studies are included from the U.S., Canada, and Australia illustrating different ways NSZD rates were quantified, how NSZD rates compared to conventional LNAPL recovery system performance, and how NSZD fit into the overall LNAPL site management strategies. <https://www.youtube.com/watch?v=RUDxFGSdYI&feature=youtu.be>

FUNGAL BIOREMEDIATION OF SOIL CO-CONTAMINATED WITH PETROLEUM HYDROCARBONS AND TOXIC METALS

Li, Q., J. Liu, and G.M. Gadd. | Applied Microbiology and Biotechnology volume 104:8999-9008(2020)

While most research has been conducted on bacterial bioremediation of soil contaminated with petroleum hydrocarbons and toxic metals, much less is known about fungi use on sites co-contaminated with both classes of pollutants. This article documents the roles of fungi in soil polluted with petroleum hydrocarbons and toxic metals and the mechanisms involved in the biotransformation of such substances. To overcome current bottlenecks in understanding fungal bioremediation, the potential of new approaches, such as gradient diffusion film technology and metabolomics, is also discussed.

HOW TO ENHANCE THE PURIFICATION PERFORMANCE OF TRADITIONAL FLOATING TREATMENT WETLANDS (FTWS) AT LOW TEMPERATURES: STRENGTHENING STRATEGIES

Kumwimba, M.N., A. Batool, and X. Li. Science of the Total Environment [Published online 3 October 2020 prior to print]

Most floating treatment wetland (FTW) studies have been performed in warm periods when FTW macrophytes are actively growing. Circumstances in low-temperature conditions can hamper the purification ability of FTWs to perform as designed. This paper summarizes strategies for enhanced FTWs in eutrophic water improvement at low temperatures and identifies future directions to be addressed in intensifying FTW performance in low-temperature conditions. Future research should be carried out at the large field-scale and focus on macrophyte-benthos-microorganism synergistic enhancement, breeding of cold-tolerant macrophytes, and combination of FTWs with many strategies, as well as rational design and operational approaches under cold conditions.

DEDICATED ISSUE: INTERNATIONAL PHYTOLOGICAL CONFERENCE (IPS) 2019 CHANGSHA

Yang, X (ed). International Journal of Phytoremediation 22(9):896-985(2020)

The seven publications that make up this dedicated issue were presented at the 16th International Phytotechnology Society on September 23-27, 2019, in

Hunan province, China. The conference brought together nearly 400 participants from nearly 40 countries comprising scientists, engineers, builders, regulators, and users working with phytotechnologies to promote successful implementation and operation of plant-based solutions. The conference's theme was "Environmental Remediation and Food Safety" and provided a platform for academic cutting-edge research results and thought exchanges in the field of international environmental remediation. Discussions primarily focused on environmental remediation, pollution prevention and control, waste disposal and recycling, agricultural high-yield, and food safety.

MANAGING AFFF IMPACTS TO SUBSURFACE ENVIRONMENTS AND ASSESSMENT OF COMMERCIALY AVAILABLE PFAS-FREE FOAMS (PART 2)

Liu, J., and G. Back | SERDP & ESTCP Webinar Series, Webinar #121, October 2020

On October 22, SERDP and ESTCP sponsored webinars on evaluating environmentally-friendly alternatives to aqueous film-forming foams (AFFFs) and novel technology to destroy PFAS in contaminated groundwater. Specifically, investigators summarized research and current understanding of PFAS defluorination and reaction mechanisms for PFAS degradation using hydrated electrons generated under ultraviolet irradiation and presented results of real-scale and laboratory-scale experiments assessing the effectiveness of AFFF alternatives, including PFAS-free foams as well as wetting agents and other water additives. <https://www.serdp-estcp.org/Tools-and-Training/Webinar-Series/10-22-2020>

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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