Entries for October 16-31, 2024

Market/Commercialization Information

F -- ENVIRONMENTAL REMEDIATION SERVICES MATOC (SOL)

U.S. Department of the Interior, Bureau of Indian Affairs, Reston, VA
Contract Opportunities on SAM.gov 140A1625R0007, 2024

This is an Indian small business economic enterprise (ISBEE) set-aside (specific to the Department of Interior and Indian Health Services) under NAICS code 562910. The Bureau of Indian Education requires a contractor to prepare an environmental hazardous material assessment and conduct remediation and repairs and radon mitigation at the Standing Rock Agency/Community School in Fort Yates, North Dakota. Work includes conducting assessments to confirm asbestos-containing material (ACM) and lead-based paint (LBP) quantities and the extent of mold contamination, designing a radon gas mitigation system, preparing a proposal to implement the mitigation work plan, and implementing the mitigation work plan and installing a radon mitigation system. Services also include repairing and replacing interior walls, floors, insulation, crawlspaces, ceiling, and roof sections directly impacted by remediation efforts, damaged, or contributing to the cause of mold growth (i.e., waterlogged materials), and radon mitigation system installation. The proposal will offer prices no higher than the ceiling prices established in the IDIQ Binding Price Schedule. The award will be a five-year multiple-award Indefinite Quantity/Indefinite Delivery (IDIQ) contract with firm-fixed-priced task orders. Awardees will compete for task orders, and task order awardees will be responsible for all labor, supervision, materials, equipment, tools, parts, supplies, and transportation to perform the services described in the drawings and specifications for each project. The Bureau of Indian Affairs plans to award three IDIQ contracts to qualified offerors. Most projects awarded on this contract will have an estimated cost of approximately $10,000 to $2,000,000; however, smaller, and larger dollar-value projects may be considered. Offers are due by 5:00 PM EST on January 14, 2025.
https://sam.gov/opp/3116cd2c0921445a84ffa85aecdf3474/view

99--PADUCAH DEACTIVATION AND REMEDIATION (PDR) PROCUREMENT (SRCSGT)

U.S Department of Energy, Environmental Management Consolidated Business Center, Cincinnati, OH
Contract Opportunities on SAM.gov 89303325NEM000045, 2024

This is a sources sought notice for marketing research purposes only. The U.S Department of Energy, Environmental Management, is in the acquisition planning stage for deactivation and remediation services at the Paducah Gaseous Diffusion Plant (PGDP or Paducah Site) under NAICS code 562910. The services to be acquired will be performed at the Paducah site, which is located on a federal reservation in Western Kentucky, approximately 8 miles west of Paducah, Kentucky, and 3.5 miles south of the Ohio River. The work is expected to be conducted under an indefinite-delivery/indefinite-quantity (IDIQ) contract to achieve a significant reduction in financial liability and environmental risk that provides the best overall optimal solution to site accelerated completion and closure. A Performance Work Statement is not available at this time; however, the Major Elements of Scope are identified in Attachment 1 of this notice. The various Major Elements of Scope have descriptive statements of DOE's "desired outcome" associated with the performance of each element. That "desired outcome" statement is intended to provide the Contractor with insight regarding DOE's perspective on the objectives that need to be accomplished in order to accelerate completion of the PDR site cleanup. Responses to this notice will be used to determine whether or not the full requirements can be performed by a small business, 8(a), HUBZone small business, small and disadvantaged business, woman-owned small business, or service-disabled-veteran-owned small business. Capability statements are due BY 5:00 PM EST on December 19, 2024.
https://sam.gov/opp/eb6ec5686b0142849da6ac238d15a1a9/view

F -- R7 GRANBY SUBDISTRICT, OPERABLE UNIT 01 AND 02 REMEDIAL ACTION, NEWTON COUNTY, MISSOURI (PRESOL)

U.S. Environmental Protection Agency, Region 7 Contracting Office, Lenexa, KS
Contract Opportunities on SAM.gov 68HE0725R0007, 2024

When this solicitation is released on or about February 10, 2025, it will be competed as a service-disabled veteran-owned small business (SDVOSB) set-aside under NAICS code 562910. EPA intends to issue a Request for Proposals for a non-residential, site-specific contract for remedial actions for mine waste located at the Granby Subdistrict, Operable Units 01 and 02, of the Newton County Mine Tailings (NCMT) Superfund site. The Granby Subdistrict is located in the central portion of Newton County, Missouri. It has been subdivided into several areas for design and remediation purposes. Tasks will consist of site remediation of soil surficial mine waste areas, contaminated soil, and contaminated intermittent stream sediment. The primary activities associated with the remedial action involve excavation, consolidation, and disposal of mine waste and associated contaminated soil/sediments, property restoration, and revegetation. EPA anticipates awarding an Indefinite Selivery/Indefinite Quantity contract with fixed unit prices contract consisting of a base period and four 12-month option periods. There is no solicitation at this time. https://sam.gov/opp/8d475827a5794dffad494058f85df71f/view

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Cleanup News

VELSICOL CHEMICAL CORPORATION SUPERFUND SITE OU1 PSA-1 AND PSA-2 SOURCE AREA REMOVAL

Michaels, A. | DCHWS West 2024 Fall Symposium, 6-8 November, Denver, CO, 15 slides, 2024

The Velsicol Superfund site OU1 PSA-1 and 2 source area removal of highly impacted soil containing xylenes, chlorobenzene, TRIS, and NAPL provided numerous challenges that were overcome to complete the cleanup successfully. Pre-construction confirmation sampling was conducted to minimize the potential for volatilization since the proposed cleanup was immediately adjacent to residential properties. Using a 45-ft by 45-ft sampling grid, over 200 soil samples were collected utilizing NAPL field screening kits. Results were used to modify excavation extents and characterize waste before construction. Before pre-construction sampling, several historic areas of radionuclide waste within proposed work zones were identified. Stop-work action levels were established, and radiation screening was continuously conducted during sampling. However, areas of elevated radiation were not identified. Heavily impacted soil was known to be present near the property boundary. To better facilitate their removal, a 757 x 30 ft excavation support wall was designed to enable excavation. During installation, settlement, and vibration were monitored near the wall and neighboring structures. Several additional efforts were undertaken to minimize the adverse effects of volatilization and dust from open excavation on neighboring properties, including continuously monitoring dust and VOCs using solar-powered perimeter air monitoring stations, a mobile station to monitor air near the work area, and monitoring with a handheld PID along the property boundary and within the neighborhood; dividing the proposed excavation into cells using a sampling grid to further modify the excavation design and remove only a couple cells of impacted material at a time before backfilling, speed up excavation efforts, and limit the amount of impacted material that could volatilize and affect neighboring properties—water trucks, misters, and odor absorbents to aid in odor and dust control. Unexpected large debris items that required special consideration were encountered during excavation. A dryer-than-expected period and excavating small cells of soil provided an opportunity to eliminate proposed sloping on portions of the excavation to remove additional contaminated material that would have otherwise required the removal of an onsite access road. The original plan called for removing 91,974 tons of heavily impacted material. After design modifications, 142,317 tons were removed without modifying the construction schedule.
https://mediacdn.guidebook.com/upload/213715/uaT1L2zsonGqm1D0CnqXC9xHvgmgE5DE6o8B.pdf
For more information see the final design report: https://semspub.epa.gov/work/05/985658.pdf

REMEDY OPTIMIZATION ANALYSIS AT A SHORELINE LANDFILL IMPACTED BY CLIMATE CHANGE

Meyer, M. | DCHWS West 2024 Fall Symposium, 6-8 November, Denver, CO, 20 slides, 2024

The 10 North End Landfill is a case study of climate change impacts on a remedy in place. It illustrates the lengthy timeframes and large-scale remedy optimization efforts that must be evaluated for sites. Site 10 is ~3.7 acres and contains an inactive shoreline landfill, with a remedy that includes an engineered cap and shoreline erosion protection. The shoreline protection was positioned based on predicted wave energies along the shoreline and included sections of armor rock and soft bank consisting of native vegetation and anchored drift logs. Actual conditions, including storm events during king tides, caused shoreline protection erosion concentrated at the transition from armor rock to soft bank protection and required repair and extension of the armor rock area six times between 2003 and 2019. Portions of landfill waste along the shoreline are submerged below sea level. Therefore, predictions regarding rising sea levels over the next 80 years were fundamental in developing and evaluating optimized remedial alternatives. Predicted sea level rise in response to climate change over these timeframes is expected to negatively impact the remedy's ability to isolate the waste and maintain landfill integrity. Where remedies involved long-term O&M or long-term monitoring, the alternatives were evaluated based on 30, 60, and 80 years to account for how these alternatives would respond to predicted sea level rise. The optimized remedial alternatives developed and evaluated include no action; continued long-term O&M, LTM, and institutional controls (ICs) under the current remedy over 30-, 60-, and 80-year timeframes; landfill removal; and Rat Island sand spit restoration as a barrier to wave impacts on the landfill over 30, 60, and 80-year timeframes. Although feasibility study evaluations typically focus on a 30-year timeframe per EPA guidance, it is not long enough to account for climate change effects. Addressing climate change effects can necessitate considering large-scale remedy changes – in this case, moving a landfill or rebuilding a barrier island. Remedy designs must now attempt to account for the long-term effects of climate change, even as climate science rapidly evolves and the scale and pace of environmental change continue to be difficult to predict accurately. Designs that do not stand up to actual conditions induced by climate change risk radical rework of remedies in place. https://mediacdn.guidebook.com/upload/213715/0zyrEEAqVodTp1nrNLAQD0pGtaWbj2xn8U0z.pdf
See climate adaptation profile: https://www.epa.gov/superfund/climate-adaptation-profile-port-hadlock-site-10-north-end-landfill

OPTIMIZATION OF BIOREMEDIATION INJECTIONS AROUND AN UNDERPERFORMING INJECTION ZONE

Diezel, B. | DCHWS West 2024 Fall Symposium, 6-8 November, Denver, CO, 20 slides, 2024

A supplemental site investigation identified reasons why bioremediation treatment was underperforming near a monitoring well within the TCE/RDX source area at the Hawthorne Army Depot. Enhanced bioremediation was selected to reduce TCE and RDX concentrations below acceptable levels for monitored natural attenuation until corrective actions could be achieved. However, further work conducted at the site to investigate and remediate groundwater contamination in the area showed poor response to previous treatments. Adaptations were made to the planned remediation program to address unexpected field observations and modify the injection approach within the constraints of an approved decision document. The supplemental investigation concluded that the treatment underperformance was the result of poor substrate distribution and contaminant mass within fine-grained soil. While drilling, soil lithology identified interbedded high and low permeability layers within the upper portion of the aquifer, and soil screening identified higher readings within lower permeability soil. The field team developed an initial theory that excess mass was retained in lower permeability soil, then modified sampling from the original plan and collected extra samples to help support the hypothesis. Excess contaminant mass in fine-grained soil was confirmed. Bioremediation was the selected remedy, utilizing an emulsified oil substrate for treatment. The new, more aggressive approach proposed to address contamination in fine-grained soils utilized a zero-valent iron for a direct contact reaction. https://mediacdn.guidebook.com/upload/213715/igsWIwUES2ZxEkr00eEo3bsucO6gCt14WVzE.pdf

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Demonstrations / Feasibility Studies

REDUCTION, COAGULATION AND BIOTIC FILTRATION (RCBF) FOR CR(VI) GROUNDWATER REMEDIATION – A CASE STUDY

Mahringer, D., M. Lutz, M. Klumbies, S. Pabst, and A.S. Ruhl.
Journal of Water Process Engineering 65:105867(2024)

A pilot scale study investigated and optimized the combined treatment process reduction, coagulation and biotic filtration (RCbF) to reduce Cr(VI) concentrations (55 µg/L) in groundwater. Fe(II) was dosed into the influent to reduce Cr(VI) to insoluble Cr(III), which was removed together with the excess Fe(II) in the subsequent biotic deep-bed filter. Biotic iron removal was established after 10 days using a Fe(II) dosage of 3-4 mg/L. Then, Fe(II) dosages, different filtration velocities, and a second Fe(II) dosage before a second biotic filter were tested. Chromium was removed to below 9.0 µg/L, even for low Fe(II) dosages of 1.0 mg/L. Higher Fe(II) doses resulted in increased chromium removals. High filtration velocities of 20 m/h (5.7 m^3/h) were possible and a short contact time of 2.7 min between Cr(VI) and Fe(II) before filtration was sufficient. During two-stage filtration (1.50 mg/L Fe(II) before filter one and 0.50 mg/L before filter two), effluent chromium concentrations of 2.0 µg/L were reliably reached. The backwash water production was minimized to 1.2 m^3 (~1 % of treated water).

LNAPL CONCEPTUAL SITE MODEL REFINEMENT AT A CONDENSATE BLOWOUT SITE

Scarzella, G. | RemTech 2024: Remediation Technologies Symposium, 16-18 October, Banff, Alberta, Canada, 20 slides, 2024

This case study outlines site characterization efforts and the development of an LNAPL management strategy at a condensate blowout site. The site is located in a remote area with a complex geological setting along a surface water body in the Alberta foothills. Multiple hydrogeologic units with LNAPL in fractured rock and strong vertical hydraulic gradients are present. Critical LCSM elements are presented with a focus on LNAPL transmissivity testing and long-term, real-time water level and LNAPL thickness monitoring using patented buoyed pressure transducer technology. Concurrent efforts are focused on 1) continuously monitoring potentiometric surface elevations and LNAPL thickness accumulations in co-located wells at different depth intervals to assess the effects of transient conditions on the potential for LNAPL vertical migration; 2) pilot remedial design to assess the volume and interconnection between different LNAPL-bearing units; and 3) an ongoing natural source zone depletion study. The presentation describes 1) site legacy and history, 2) transmissivity testing methodology, results, and analysis, 3) buoyed pressure transducer installation and results and analysis, 4) progress of pilot remedial system design and related challenges, and 5) next steps based on available information at the time of publication.
Slides: https://esaa.org/wp-content/uploads/2024/10/RT2024-SCARZELLA.pdf
Longer Abstract: https://esaa.org/wp-content/uploads/2024/09/RT2024-program-Abstracts-54.pdf

SPECTRAL INDUCED POLARIZATION (SIP) MEASUREMENTS ACROSS A PFAS-CONTAMINATED SOURCE ZONE

Siegenthaler, E., S. Falzone, C. Schaefer, D. Werkema, and L. Slater.
Journal of Hazardous Materials 480:135829(2024)

Field-scale Spectral Induced Polarization (SIP) geophysical measurements were acquired on a transect crossing an AFFF source zone. Soil samples were collected to determine variations in PFAS concentrations, characterize soil texture, and create triplicate soil columns for lab SIP measurements. Field and lab observations show that SIP measurements are sensitive to the concentration of AFFF constituents associated with soil pore surface area. The specific polarizability and the phase of the SIP measurements for the lab samples were linearly correlated with total soil-sorbed PFAS concentration. The phase from the field SIP measurements was highest over the location of maximum PFAS concentration measured in the lab samples. However, a significant correlation between the field-measured phase and lab-measured total PFAS concentration still needs to be established. These observations, along with the demonstrated sensitivity of the SIP response to the removal of soil PFAS using a methanol wash procedure, support the case for SIP characterization of AFFF source zones.
https://www.sciencedirect.com/science/article/pii/S0304389424024087/pdfft?md5=0f84dc4fe4ec94882628c5f8584f6d34&pid=1-s2.0-S0304389424024087-main.pdf

ELECTRICAL RESISTIVITY IMAGING (ERI) OF A DNAPL SITE: WHAT HAPPENS WHEN RESULTS DON'T EQUAL SUCCESS?

Fields, Jr. J. | Battelle 2024 Chlorinated Conference, 2-6 June, Denver, CO, poster, 2024

TCE, both dissolved phase and a DNAPL, prevalent in groundwater at a former Naval Ordnance Plant, led to vapor intrusion issues that have since been mitigated, leaving groundwater contamination. A partially delineated TCE plume in a sandy surficial aquifer absorbed into the underlying clay confining unit. Site characterization performed via monitoring wells and soil borings identified the main source area near a historic storm sewer outfall at the western edge of the site with DNAPL near the base of the previous depth of investigation. Groundwater concentrations indicative of NAPL were also identified in the central area of the site. However, the vertical and horizontal extent into and across the clay confining unit was unknown. The area of interest is an open field downgradient of the historic storm sewer outfall, located above the expected highest contaminant concentrations with a former explosives blending plant and storm drains to the north and east. The objective was to perform electrical resistivity imaging (ERI) surveys, providing thousands of data points in 2D space, and cross-reference the results with previous high-resolution lithological and chemical analysis of soil cores and groundwater samples, which provide data points, few and far between, in only 1D space. The ERI surveys were verified with confirmatory drilling, lithologic logging, sample collection, and analytical analysis. The goal of the effort was to expand the footprint of the previous investigations and demonstrate that a relatively inexpensive, fast, high-resolution, and non-invasive alternative geophysical field technique could delineate both the vertical and horizontal extent of the contaminant source area.
https://cfpub.epa.gov/si/si_public_file_download.cfm?p_download_id=549590&Lab=CESER

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Research

ELECTRON BIFURCATION AND FLUORIDE EFFLUX SYSTEMS IMPLICATED IN DEFLUORINATION OF PERFLUORINATED UNSATURATED CARBOXYLIC ACIDS BY ACETOBACTERIUM SPP

Yu, Y., F. Xu, W. Zhao, C. Thoma, S. Che, J.E. Richman, B. Jin, Y. Zhu, Y. Xing, L. Wackett and Y. Men. | Science Advances 10(29):eado2957(2024)

This article reports on the reductive defluorination of α, β-unsaturated per- and polyfluorocarboxylic acids by *Acetobacterium* spp. The microbial defluorination products were structurally confirmed and showed regiospecificity and stereospecificity, consistent with their formation by enzymatic reactions. A comparison of defluorination activities among several *Acetobacterium* species indicated that a functional fluoride exporter was required for the detoxification of the released fluoride. Results from in vivo inhibition tests and in silico enzyme modeling suggested enzymes of the flavin-based electron-bifurcating caffeate reduction pathway [caffeoyl-CoA reductase (CarABCDE)] are involved in the reductive defluorination. https://www.science.org/doi/epdf/10.1126/sciadv.ado2957

SYNERGISTIC MATERIAL-MICROBE INTERFACE TOWARD DEEPER ANAEROBIC DEFLUORINATION

Che, S., X. Guan, R. Rodrigues, Y. Yu, Y. Xie, C. Liu and Y. Men Y. (2024).
Proceedings of the National Academy of Sciences of the United States of America 121(31):e2400525121(2024)

In this study, integrating an enrichment culture of reductive defluorination with biocompatible electrodes for the electrochemical process achieved deeper C_6-perfluorinated unsaturated PFAS defluorination compared to the biological or electrochemical system alone. Two synergies in the bioelectrochemical system were identified: 1) the in-series microbial-electrochemical defluorination and 2) the electrochemically enabled microbial defluorination of intermediates. These synergies at the material-microbe interfaces surpassed the limitation of microbial defluorination. They also further turned the biotransformation end products into less fluorinated products, which could be less toxic and more biodegradable in the environment. This material-microbe hybrid system brings opportunities in the bioremediation of PFAS driven by renewable electricity and warrants future research on mechanistic understanding of defluorinating and electroactive microorganisms at the material-microbe interface for system optimizations.

MODEL-BASED ANALYSIS OF ARSENIC RETENTION BY STIMULATED IRON MINERAL TRANSFORMATION UNDER COASTAL AQUIFER CONDITIONS

Barron, A., J. Jamieson, M. Colombani, B. Bostick, P. Ortega-Tong, C. Sbarbati, M. Barbieri, M. Petitta and H. Prommer.
ACS ES&T Water 4(7):2944-2956(2024)

A process-based numerical modeling framework was developed to provide a deeper understanding of the geochemical mechanisms controlling the response of As-contaminated sediments to Fe(II) nitrate treatment. Analyzed data sets included time series from two batch experiments (control vs treatment) and effluent concentrations from a flow-through column experiment. The reaction network incorporates a mixture of homogeneous and heterogeneous reactions affecting Fe redox chemistry. Modeling revealed that precipitation of the Fe treatment caused a rapid pH decline, which then triggered multiple heterogeneous buffering processes. The model quantifies key processes for effective remediation, including aqueous As transfer to adsorbed As and the transformation of Fe minerals, which act as sorption hosts, from amorphous to more stable phases. The developed model provides the basis for predicting the remedial benefits of Fe(II) nitrate treatments under varying geochemical and hydrogeological conditions, particularly in high-As coastal environments.

STATISTICAL MAPPING OF PFOA AND PFOS IN GROUNDWATER THROUGHOUT THE CONTIGUOUS UNITED STATES

Park, B., H. Kang, and C. Zahasky. | Environmental Science & Technology 58(44):19843-19850(2024)

An analysis adopted an inhomogeneous Poisson process (IPP) modeling approach from ecological statistics to continuously map PFAS distributions in groundwater across the contiguous U.S. The model is trained on a unique data set of 8,910 PFAS groundwater measurements, using combined concentrations of two PFAS analytes. The IPP model predictions were compared with results from random forest models to highlight the robustness of this statistical modeling approach on sparse data sets. This analysis provides a new approach to not only map PFAS contamination in groundwater but also prioritize future sampling efforts.

CHARACTERIZING THE AREAL EXTENT OF PFAS CONTAMINATION IN FISH SPECIES DOWNGRADIENT OF AFFF SOURCE ZONES

Pickard, H.M., B.J. Ruyle, F. Haque, J.M. Logan, D.R. LeBlanc, S. Vojta, and E.M. Sunderland.
Environmental Science & Technology 58(43):19440-19453(2024)

This study reports paired PFAS measurements in water, sediment, and aquatic biota along a hydrological gradient away from source zones contaminated by legacy AFFF manufactured using electrochemical fluorination. Clustering analysis indicated that the PFAS composition characteristic of AFFF is detectable in water and fish >8 km from the source. Concentrations of 38 targeted PFAS and extractable organofluorine (EOF) decreased in fish downgradient of the AFFF-contaminated source zones. However, PFAS concentrations remained above consumption limits at all locations within the affected watershed. Perfluoroalkyl sulfonamide precursors accounted for ~1/2 of targeted PFAS in fish tissue, which explains >90% of EOF across all sampling locations. Suspect screening analyses revealed the presence of a polyfluoroketone pharmaceutical in fish species, and a fluorinated agrochemical in water that likely does not accumulate in biological tissues. This suggests the presence of diffuse sources such as septic system and agrochemical inputs throughout the watershed in addition to AFFF contamination. Based on these results, monitoring programs that consider all hydrologically connected regions within watersheds affected by large PFAS sources would help ensure public health protection.

CONCEPTUALIZING CONTROLLING FACTORS FOR PFAS SALTING OUT IN GROUNDWATER DISCHARGE ZONES ALONG SANDY BEACHES

Hort, H.M., C.E. Robinson, A.H. Sawyer, Y. Li, R. Cardoso, S.A. Lee, D. Roff, D.T. Adamson, and C.J. Newell. | Groundwater 62(6):860-875(2024)

This study aimed to conceptually explore the potential for "PFAS Salting Out" in sand beach environments and perform preliminary broad-scale characterization of sandy shoreline areas in the continental U.S. "PFAS Salting Out" in groundwater is an understudied process where PFAS in fresh groundwater mixes with saline groundwater near marine shorelines, which increases sorption of PFAS to aquifer solids. While sorption reduces PFAS mass discharge to marine surface water, the fraction that sorbs to beach sediments may be mobilized under future salinity changes. The conceptual approach involved developing a multivariate regression model that assessed how tidal amplitude and freshwater submarine groundwater discharge affect the mixing of fresh and saline groundwater in sandy coastal aquifers without using site-specific PFAS data. The model was applied to 143 U.S. shoreline areas with sandy beaches, indirectly mapping potential salinity increases in shallow freshwater PFAS plumes as low (20 ppt) along groundwater flow paths before reaching the ocean. Higher potential salinity increases were observed in West Coast bays and the North Atlantic coastline due to moderate to large tides and large fresh groundwater discharge rates. Lower increases occurred along the Gulf of Mexico and the southern Florida Atlantic coast. The salinity increases were used to estimate potential PFOS sorption in groundwater due to salting out processes. Low-category shorelines may see a 1- to 2.5-fold increase in sorption of PFOS, medium-category a 2.0- to 6.4-fold increase, and high-category a 3.8- to 25-fold increase in PFOS sorption.

NEW STRATEGY TO OPTIMIZE IN-SITU FENTON OXIDATION FOR TPH CONTAMINATED SOIL REMEDIATION VIA ARTIFICIAL NEURAL NETWORK APPROACH

Choong, C.E., K.T. Wong, S.Y. Yoon, N.A. Rahman, Y. Yoon, E.H. Choi, and M. Jang.
Chemosphere 363:142757(2024)

A practical and novel approach is introduced that uses soft computational models and a multilayer perception artificial neural network (MPLNN), to predict TPH removal performance. In a study, 48 TPH removal experiments were conducted using Fenton oxidation to determine the TPH removal performance of a wide range of ground conditions and generated 336 data points. A negative Pearson correlation coefficient was obtained in the Fe injection mass and the natural presence of Fe mineral in the soil, indicating that the excess of Fe could significantly retard the TPH removal performance in the Fenton reaction. The MPLNN model with 6-6-1 training using Scaled conjugate gradient backpropagation with tangent sigmoid as the transfer function demonstrated a high accuracy for TPH removal prediction with a correlation determination of 0.974 and mean square error value of 0.0259. The optimized MPLNN model achieved < 20% error for predicting TPH removal performance in actual TPH-contaminated soil via Fenton oxidation.

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General News

BRIDGING THE TECHNOLOGY GAP FOR COST-EFFECTIVE AND SUSTAINABLE TREATMENT OF PER- AND POLYFLUOROALKYL SUBSTANCES IN SURFACE WATER AND STORMWATER

Gamlin, J.D., H. Javed, C.J. Newell, E. Stockwell, R. Caird, J. Scalia, D. Navarro, and J. Awad.
Remediation 35(1):e21790(2024)

The urgent need for cost-effective and sustainable methods to mitigate PFAS contamination in surface water and stormwater is addressed in this article. Although the majority of PFAS research and development has focused on groundwater and soil treatment technologies, in some cases there may be a greater risk posed by the high mobility and potential for direct contact with PFAS in surface water and stormwater. Additional attention is needed to support the development of effective and practical treatment technologies for PFAS in surface water and stormwater based on the evolving regulatory landscape and the elevated PFAS concentrations observed in available stormwater data near some fire training facilities. The authors propose addressing the need to bridge the current technology gap between expensive mechanical and/or construction-intensive technologies and developing cost-effective and sustainable surface water and stormwater PFAS treatment options. The authors envision a future where nature-based approaches could be employed for stand-alone PFAS treatment. Nature-based approaches could be used for initial PFAS mass removal as a pretreatment step within a treatment train followed by engineered adsorbents or other technologies to achieve low-concentration cleanup thresholds. The article provides examples of a potential nature-based treatment train that would rely on the natural propensity of PFAS to accumulate in surface water foams using foam-enhancing weirs and flumes, combined with the demonstrated treatment potential of constructed floating wetlands. Additional research into the validation, optimization, and site-specific design factors of nature-based treatment

trains, such as the FWF+CFW approach, warrants future research and development.

AN OVERVIEW OF 6PPD-QUINONE: WHERE WE STARTED, WHERE WE ARE NOW, AND WHERE WE ARE HEADED

Lawrence, C. and J. McIntyre. | 14th Annual SABCS Workshop & Conference on Contaminated Sites, 25-26 September, British Columbia, Canada, 30 slides, 2024

This presentation covers how researchers linked stormwater and tire chemicals to coho mortality and provides an overview of ongoing current research in the aquatic ecotoxicology lab at Washington State University. The search for alternatives to 6PPD and the regulatory actions being taken at the state and federal levels in the U.S. are also described.
https://sabcs.ca/wp-content/uploads/2024/10/340_Lawrence_6PPD_updatedFINAL.pdf

AI VS. ENVIRONMENTAL EXPERTS: ARE HUMANS BECOMING OBSOLETE IN REMEDIATION DESIGN

French, K. | 14th Annual SABCS Workshop & Conference on Contaminated Sites, 25-26 September, British Columbia, Canada, 47 slides, 2024

This presentation explores the advantages and limitations of AI, highlighting its potential to autonomously design remediation strategies based on vast datasets, scientific principles, and optimization algorithms. The roles of human professionals in the AI-enabled remedial design process are examined through examples and case studies. The presentation aims to spark a discussion on the future of environmental expertise and collaboration between human professionals and AI systems and present an engaging exploration of the evolving landscape, where hyper-efficient AI algorithms intersect with human intellect and experience.
https://sabcs.ca/wp-content/uploads/2024/10/200_French_AI.pdf

DATA EVALUATION FRAMEWORK FOR REFINING PFAS CONCEPTUAL SITE MODELS

Gamlin, J., C.J. Newell, C. Holton, P.R. Kulkarni, J. Skaggs, D.T. Adamson, J. Blotevogel, and C.P. Higgins. | Groundwater Monitoring & Remediation 44(4):53-66(2024)

This article introduces a framework that relies on commonly available PFAS data to assist in identifying PFAS source areas and assess PFAS fate and transport considerations along flow paths. Currently accepted PFAS physical and chemical behaviors have been incorporated into metrics that can be evaluated geospatially and/or over time to build a weight-of-evidence approach to refine conceptual site models. It proposes a graphical data representation according to a PFAS "family tree" for more consistent interpretation and pattern recognition. Combined, these tools create a PFAS data evaluation framework (PFAS Framework) that consists of a tiered analysis approach based on data availability and site complexity. Case studies from real sites are presented to demonstrate the capabilities of the PFAS Framework in identifying source areas.
https://ngwa.onlinelibrary.wiley.com/doi/epdf/10.1111/gwmr.12666

SAMPLING IN LONG-SCREENED WELLS: ISSUES, MISCONCEPTIONS, AND SOLUTIONS

Day-Lewis, F.D., R.D. Mackley, and R. Bence. | Groundwater 62(5):669-680(2024)

This issue paper provides a conceptual overview of the problems posed by long-screened wells (LSWs) and a review of existing literature and past work to improve the interpretation of sampling in LSWs. It draws on experience from previous studies at the Hanford Site and uses synthetic examples to illustrate key concepts and challenges for interpretation. A recently published analytical modeling framework is used to develop illustrative synthetic examples and demonstrate a workflow for building scientific intuition to understand issues around interpreting samples from LSWs, which is critical to effective characterization and groundwater remediation at sites with LSWs. https://ngwa.onlinelibrary.wiley.com/doi/epdf/10.1111/gwat.13427

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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