Entries for February 1-15, 2025

Market/Commercialization Information

F -- USACE, KANSAS CITY SB PRAC MATOC (PRESOL)
U.S. Army Corps of Engineers, Northwestern Division, Kansas City District, Kansas City, MO
Contract Opportunities on SAM.gov W912DQ25RA012, 2025

This solicitation is a total small business set-aside under NAICS code 562910. The U.S. Army Corps of Engineers Northwestern Division requires contractors with the capability and experience to perform a wide range of remedial action services at hazardous waste sites, incling environmental removal actions, remedial actions, other remediation activities, and related activities necessary to ensure complete and successful remediation. Remedial activities may include, but not be limited to, excavation, transportation, and disposal of hazardous, toxic, or low-level radiological waste; construction and operation of groundwater treatment facilities including structures, treatment equipment, related extraction well networks and piping; dredging, ex-situ or in-situ treatment, and disposal of contaminated sediments; decommissioning of existing facilities; installation and operation of in situ treatment technologies including but not limited to air sparging, chemical oxidation, chemical reduction, enhanced bioremediation, groundwater circulating wells, permeable reactive barriers, soil vapor extraction, and thermal treatment; remediation incidental to munitions constituents; mine waste reclamation or reclamation of abandoned mine lands; water line installations/service connections and the installation of well head treatment systems; and utility line replacement and/or remediation along utility lines; and erosion, sewer, and storm water controls for the purpose of compliance and/or pollution prevention. Supporting activities include, but are not limited to, sampling and laboratory analysis of soil, groundwater, surface water, air, and sediments; monitoring well, extraction well, and injection well installation, monitoring, and maintenance; supporting facilities for construction; work plan preparation; construction completion reports, as-built drawings, periodic monitoring reports, operation and monitoring reports, and other documents as needed; demolition; and public relations activities. The award will be a Multiple Award Task Order Contract (MATOC) with a maximum value of $245 million. There is no limit to the number of Task Orders that may be issued against the MATOC. Orders may be either fixed-price or cost-reimbursement type.
https://sam.gov/opp/4438de46ba7f4400bb6807a7694d9236/view

R -- R7 SUPERFUND TECHNICAL ASSESSMENT & RESPONSE TEAM (SOL)
U.S. Environmental Protection Agency, Region 7, Lenexa, KS
Contract Opportunities on SAM.gov 68HE0725R0002, 2025

This is a full and open competition. EPA Region 7 requires a contractor to provide nationally consistent services to EPA On-Scene Coordinators (OSCs) and other federal officials implementing EPA's responsibilities under the National Response System under NAICS code 541620. The contractor shall maintain a 24-hour, seven-days-a-week, year-round response capability to respond to EPA's needs pursuant to the terms of this contract on a regional, backup regional, cross-regional, national, and international response. The contractor shall fulfill these responsibilities within the region as well as outside the region on a backup regional response, cross-regional response, national response, and international response. Areas of work include response activities related to emergencies; counter terrorism; oil spills; federal disasters; removal assessments; fund-lead removals; Potential Responsible Parties; and minor containments; Preparedness and Prevention Activities; Assessment/Inspection Activities; Technical Support Activities; Data Management Support; and Training. The award will be an Indefinite Delivery/Indefinite Quantity contract with a seven-year and six-months performance period if all options are exercised. Offers are due by 1:00 PM CDT on April 3, 2025. https://sam.gov/opp/dd80d9e930d24137915dee4eeec3e894/view

F -- R10 EMERGENCY AND RAPID RESPONSE SERVICES (ERRS) (SOL)
U.S. Environmental Protection Agency, Region 7, Lenexa, KS
Contract Opportunities on SAM.gov 68HE0725R0001, 2025

This is a total small business set-aside under NAICS code 562910. The EPA Region 7 Acquisition Management Branch requires a contractor to perform under the Emergency Rapid Response Services VI contract. This contract will support EPA Region 10's Superfund and Emergency Management Division and its Emergency Response, Planning, and Preparedness branch in fulfilling EPA's mission to protect human health and the environment. Work will include support for fast, responsive environmental cleanup services for release of hazardous substances/wastes/pollutants and contaminants/materials and petroleum products/oil for EPA Region 10. Environmental cleanup in response to natural and manmade disasters, terrorist activities, weapons of mass destruction, and nuclear, biological, or chemical incidents may also be required under this contract. A regional "cross-over," a response in another EPA region, may be ordered under this contract. It is also anticipated that under rare circumstances international responses may be required. The award will be Indefinite Delivery/Indefinite Quantity contract with one three-year base period and two two-year option periods. Offers are due by 4:30 PM PDT on April 7, 2025.
https://sam.gov/opp/40aae53591a2478f9f25a6f7fa28eae1/view

USACE-INDUSTRY ENGAGEMENT: ENTERPRISE ENVIRONMENTAL ACQUISITION STRATEGY (EEAS) (SNOTE)
U.S. Army Corps of Engineers, Northwestern Division, Omaha District, Omaha, NE
Contract Opportunities on SAM.gov W9128F25SE001, 2025

The U.S. Army corps of Engineers has scheduled an industry day from 10:00 AM - 11:30 AM on April 8, 2025, to ask any questions related to its Enterprise Environmental Acquisition Strategy (EEAS), for which a sources sought announcement (W9128F24E002) was posted March 2024 for EEAS. Work under the EEAS falls under Engineering Services, Environmental Remediation Services, and Environmental Consulting Services under NAICS code 562910. The coverage area for these services is anticipated to be the U.S., including Hawaii, Alaska, and the U.S. territories. All qualified, interested, capable firms are highly encouraged to participate in Industry Day. The meeting will be held via Microsoft Teams with a dial-in option available.
https://sam.gov/opp/bc609dec55814650b90bdc7f96224b59/view

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Cleanup News

WHOLE METAGENOME SEQUENCING AND 16S RRNA GENE AMPLICON ANALYSES REVEAL THE COMPLEX MICROBIOME RESPONSIBLE FOR THE SUCCESS OF ENHANCED IN-SITU REDUCTIVE DECHLORINATION (ERD) OF A TETRACHLOROETHENE-CONTAMINATED SUPERFUND SITE

Reiss, R.A., P.A. Guerra, O. Makhnin, and M. Kellom. | PLoS ONE 20(2):e0306503(2025)

Contamination at the North Railroad Avenue Plume (NRAP) Superfund site was the result of a release from a dry cleaner that operated for 37 years. The presence of tetrachloroethene biodegradation byproducts, organohalide respiring genera, and reductive dehalogenase (*rdh*) genes detected in groundwater samples indicated using enhanced reductive dechlorination (ERD) via mixing emulsified vegetable oil into the contaminated aquifer. Metagenomic techniques were combined with site monitoring metadata to reveal new details of ERD. DNA extracts from groundwater samples collected before and at 4, 23, and 39 months after remedy implementation were analyzed using whole metagenome sequencing (WMS) and 16S rRNA gene amplicon (16S). Indigenous NRAP microbiome to ERD protocol responses were consistent with results obtained from microcosms, dechlorinating consortia, and observations at other contaminated sites. WMS detects 3 times as many phyla and 6 times as many genera as 16S. Both techniques revealed abundance changes in *Dehalococcoides* and Dehalobacter that reflect organohalide form and availability. Methane was not detected before biostimulation but appeared afterward, corresponding to an increase in methanogenic *Archaea*. Assembly of WMS reads produced scaffolds containing *rdh* genes from *Dehalococcoides*, *Dehalobacter*, *Dehalogenimonas*, *Desulfocarbo*, and *Desulfobacula*. Anaerobic and aerobic cometabolic organohalide degrading microbes that increased in abundance include methanogenic *Archaea*, methanotrophs, *Dechloromonas*, and *Xanthobacter*, some of which contain hydrolytic dehalogenase genes. Aerobic cometabolism may be supported by oxygen gradients existing in aquifer microenvironments or by microbes that produce O_2 via microbial dismutation. The NRAP model for successful ERD is consistent with the established pathway and identifies new taxa and processes that support this syntrophic process. *This article is* ***Open Access*** *at* https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0306503

PERMEABLE REACTIVE BARRIERS (PRBS), A SUSTAINABLE APPROACH FOR GROUNDWATER REMEDIATION

Dennis, P., L. Smith, C. Scales, and J. Roberts.
SMART Remediation, 30 January, Ottawa, 30 slides, 2025

This presentation provides case studies for different PRB configurations to treat chlorinated solvents, including a full-scale emulsified vegetable oil KB-1 bioaugmented bio-barrier application, a combined bio-zero valent iron barrier, and an overview of wood mulch PRB performance.
https://smartremediation.com/wp-content/uploads/2025/02/SMART-Toronto_Ottawa-2025-Phil-Dennis.pdf

OH, THE HUMIDITY! USING AIR PURIFICATION FOR RAPID VAPOUR INTRUSION MITIGATION OF TCE

Mali, D. | SMART Remediation, 30 January, Ottawa, 26 slides, 2025

This presentation provides an overview of a study to assist U.S. Navy remedial project managers and their consultants with the selection, operation, and maintenance of air purifying units (APUs) for vapor intrusion mitigation. Three types of APUs (granular activated carbon, hydrophobic zeolite, and the SmogStop® filter) were tested under controlled lab conditions and in real-world conditions at the Washington Navy Yard. The study revealed that the change-out frequency of the filters may be much higher than previously expected. High humidity levels can affect the adsorption capacity of filter media, reducing their efficiency and lifespan. Additionally, low-concentration TCE does not follow the same trends expected in other granular activated carbon (GAC) applications, complicating the mitigation process further. The presentation also covers the applicability and limitations of a mathematical model (MultiVapor™) to determine carbon filter change-out frequencies for APUs.
https://smartremediation.com/wp-content/uploads/2025/02/SMART-Ottawa-2025-Darius-Mali.pdf

DATA ANALYTICS LEVERAGED TO UPDATE A PFAS CONCEPTUAL SITE MODEL (CSM): HOW FINGERPRINTING AND MACHINE-LEARNING TOOLS CAN INFORM SITE ASSESSMENT AND MANAGEMENT

Herczegh, S., P. Hurst, and S. Sorsby. | SMART Remediation, 30 January, Toronto, 13 slides, 2025

This presentation details the application of fingerprinting tools and machine learning in updating a PFAS CSM, specifically highlighting key outcomes, identified trends, and the applicability to investigate contaminant transport to offsite receptors. Key learnings are also presented from additional case studies where PFAS fingerprinting and machine learning were applied during CSM preparation, including in data gap analysis, development of a staged workplan, consideration of targeted remedial approach options, and applicability to investigations of source attribution.
https://smartremediation.com/wp-content/uploads/2025/02/SMART-Toronto-2025-Sofia-Herczegh.pdf

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Demonstrations / Feasibility Studies

LONG TERM IMPACT OF ELECTRICAL RESISTANCE HEATING ON SOIL BACTERIAL COMMUNITY BASED ON A FIELD TEST

Xu, W., L. Cao, R. Ge, S. Li, Y. Wei, Y. Yang, G. Li, and F. Zhang.
Science of The Total Environment 950:175292(2024)

Soil samples were collected at different locations after heating for 116 days during a pilot test of electrical resistance heating remediation (ERH). Most soil physicochemical properties were less affected by the heating temperature difference. Applying high temperatures increased microbial abundance but inhibited alpha diversity of the bacterial community. More significant changes in microbial communities were observed at temperatures >60°C. The genera mainly affected by heating temperature included *Flavobacteria, Brockia*, and S085, while the increase in temperature also inhibited the abundance of nitrochlorobenzene functional genes. The bacterial community impacted by thermal remediation was able to recover effectively 140 days after the pilot test ended, with the recovery process unaffected by temperature differences during the heating period. Results provide valuable field evidence of the long-term impact of ERH treatment on soil properties and microbial communities and provide further references for optimization of remediation performance with coupled technologies.

ENHANCED AEROBIC BIOREMEDIATION OF AN AQUIFER HEAVILY CONTAMINATED WITH A MIXTURE OF CHLOROBENZENES AND HEXACHLOROCYCLOHEXANES AT THE SARDAS LANDFILL (SPAIN)

Soder-Walz, J.M., D. Salom, E. Granados-Rigol, D. Fernandez-Verdejo, T. Vicent, E. Marco-Urrea, and P. Blanquez. | Journal of Hazardous Materials 484:136717(2025)

Microcosms using field-derived groundwater were constructed to evaluate in situ bioremediation at a landfill contaminated with benzene, chlorobenzenes, and hexachlorocyclohexane (HCH) isomers in Huesca, Spain. Anaerobic biostimulation with lactate successfully transformed α-, β-, δ-, and γ-HCH within 2 weeks but failed to degrade benzene and less chlorinated benzenes even with nutrient addition. Aerobic biostimulation led to rapid degradation of benzene, chlorobenzenes, and α-, δ-, and γ-HCH; adding a phosphorus source significantly increased the degradation rates. Following lab results, an in situ pilot test using CaO_2 was conducted at two site injection wells. Field results mirrored those from the microcosms, showing a marked reduction in contaminants at both the injection wells and surrounding wells. Bacterial community analysis based on the 16S rRNA genes in samples derived from aerobic microcosms and groundwater before and after the test revealed a marked increase in the genus *Pseudomonas*, suggesting its potential role as a biodegrading agent.

DESTRUCTION OF PFAS USING A NOVEL APPROACH TO CATALYZED CHEMICAL OXIDATION

Li, Tom. | SMART Remediation, 30 January, Ottawa, 21 slides, 2025

An innovative means to destroy PFAS in soil and groundwater in situ and ex situ was developed by combining a small temperature rise, a metal-based catalyst, and off-the-shelf oxidant products. The patent-pending methodology, known as Hot ISCO, has been demonstrated to degrade PFAS to non-toxic end products, including fluoride, salts, and carbon dioxide. The technology was developed through lab work, field pilots, and ~40 individual lab and field trials. Hot ISCO achieved PFAS destruction efficiencies in the lab of > 99.9% within method detection limits and > 90% destruction efficiency during large-volume mixed matrix ex situ field trials. To date, mixed matrix (soil and groundwater) trials have been completed using PFAS-contaminated matrices from sites in Michigan, New York, New Jersey, and North Carolina. See presentation for results and lessons learned from four years of research and development: https://smartremediation.com/wp-content/uploads/2025/02/SMART-Ottawa-2025-Tom-Li.pdf

A NEW LOOK AT DIFFUSION IN VAPOR INTRUSION ASSESSMENTS; PASSIVE ADSORPTIVE DIFFUSION SAMPLERS

Niemet, M., B. Thompson, K. Rabe, and H. O'Neill.
Groundwater Monitoring & Remediation 45(1):30-54(2025)

This article explores the hypothesis that molecular diffusion through a building slab may play a larger role in vapor intrusion than previously thought, potentially being the predominant vapor intrusion mechanism when the sub-slab vapor source strength is sufficiently high or the pressure differential is relatively low. A novel Passive Adsorptive Diffusion Sampler (PADS) was tested to directly measure VOC diffusion through a building slab at a vacant warehouse. Historical sampling determined that vapor intrusion of TCE was adversely impacting the indoor air. Calculations using Fick's First Law of Diffusion demonstrated that diffusion alone could theoretically account for all the TCE observed in the indoor air based on an effective diffusion coefficient for concrete that was calculated from the Johnson and Ettinger Model. Two groups of nine replicate PADS were deployed at two areas on the slab to measure the flux and effective diffusion coefficient at 18 points. They showed an order of magnitude variability within each area and over two orders of magnitude variability overall. Results indicate that diffusion through concrete is inherently variable when measured at a sub-meter scale. However, when combined over both areas, the overall average approached calculations from the Johnson and Ettinger Model. An additional 12 PADS were deployed across the building slab (for a total of 30) to quantify the overall building-wide diffusive flux. This area-weighted average diffusive flux was consistent with the predicted diffusive flux as calculated from Fick's First Law and the vapor intrusion mass input required to achieve the observed indoor air TCE concentration. Results show that PADS provides a simple way to measure diffusive flux directly without having to drill through the slab. However, significant variability in the measured flux should be expected and will need to be accounted for by the inclusion of a relatively large number of samples, including replicates. When using PADs at a new site, collecting traditional sub-slab vapors at a select number of locations is recommended to verify a building-specific effective diffusion coefficient.

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Research

PHYTOTOXICITY AND PHYTOREMEDIATION POTENTIAL OF LEMNA MINOR EXPOSED TO PERFLUOROOCTANOIC ACID

Noori, A., L. Corbelli, E. Lincoln, S. Thomas, J. Jones, S.L. Nason, J.C. White, R. Lewis and C.L. Haynes.
Frontiers in Plant Science 15:1493896(2025)

A study focused on the physiological response of duckweed (*Lemna minor*) exposed to PFOA to determine phytotoxicity and the potential of this aquatic species to remove PFOA. A time-dependent phytotoxicity assay showed that exposure to 0.1 µg/L PFOA for 14 days resulted in chlorophyll pigment loss and 15-25% more chlorosis than in controls. Although exposure to PFOA for 7 days resulted in chlorosis, no significant impact on physiological parameters such as photosynthetic pigment or anthocyanin content was detected. Analysis of cellular size on days zero and 7 showed that the control group showed significantly larger cell size after 7 days (213 ± 6.5 μm^2) compared with the day zero group (186 ± 18 μm^2), while the size of the PFOA-exposed group (198 ± 13 μm^2) did not change significantly after 7 days compared with the day zero group. The nuclear size increased significantly by 13% upon PFOA exposure compared with the controls ($\rho < 0.0001$). The concentration of K, Cu, Fe, Mn, Zn, Mo were reduced in *L. minor* exposed to PFOA compared with the controls by 39.6, 33.4, 42.1, 35.2, 31.9, 40.2%, respectively. Additionally, PFOA accumulated in *L. minor* fronds and roots with an average bioaccumulation factor of 56 ± 7. While some toxicity symptoms were observed, the study shows that *L. minor* can tolerate up to 0.1 µg/L PFOA and can remove PFOA from water. https://www.frontiersin.org/journals/plant-science/articles/10.3389/fpls.2024.1493896/full

ISOLATION, CHARACTERIZATION, AND MYCOSTIMULATION OF FUNGI FOR THE DEGRADATION OF POLYCYCLIC AROMATIC HYDROCARBONS AT A SUPERFUND SITE

Crittenden, J., D. Raudabaugh and C.K. Gunsch. | Biodegradation 36:15(2025)

Potential polycyclic aromatic hydrocarbon (PAH)-degrading fungal isolates were isolated, characterized, and identified from

creosote-contaminated sediment in the Elizabeth River, Virginia, to identify non-basidiomycete PAH-degrading fungi. A total of 132 isolates were isolated, with the overwhelming majority belonging to the phylum Ascomycota. Isolates were screened for their ability to produce the known PAH degrading enzymes laccase and manganese-dependent peroxidases and to transform model PAH compounds. Fungal isolates were subsequently biostimulated using complex amendments, including chicken feathers, wheat seeds, grasshoppers, and maple sawdust. Following biostimulation, laccase expression and PAH transformation were assessed. The grasshopper amendment yielded the highest laccase upregulation improvement, with a max increase of 18.9% for the *Paraphaeosphaeria* isolate. The *Septoriella* and *Trichoderma* isolates exposed to the chitin-based grasshopper amendment demonstrated an increase in PAH removal. *Septoriella* sp. increased transformation of fluoranthene (44%), pyrene (54.2%, and benzo(a)pyrene (48.7%), while there was a 58.3% increase in benzo(a)pyrene removal by *Trichoderma* sp. While results demonstrate the potential of indigenous fungi to be biostimulated for PAH removal, additional investigation is needed to determine if the response to the chitin-based grasshopper mycostimulation can be translated from the bench to the field.
https://pmc.ncbi.nlm.nih.gov/articles/PMC11761828/pdf/10532_2024_Article_10106.pdf

NOVEL INSIGHT INTO DERIVING REMEDIATION GOALS OF ARSENIC CONTAMINATED SITES WITH MULTI-MEDIA-EQUIVALENT DOSE AND LOCAL EXPOSURE PARAMETERS

Yang. D., X. Jia, T. Xia, N. Zhang, S. Su, Z. Tao, Z. Wu, J. Liang, and L. Zhang.
Journal of Hazardous Materials 482:136501(2025)

The remediation goal (RG) for As calculated by the traditional method is ~0.45 mg/kg, significantly lower than background values, which poses significant challenges to managing As-contaminated sites. A study focused on a typical glassworks site with an As contamination level of up to 298 mg/kg, predominantly existing as As(III), with a carcinogenic risk level as high as 8.6×10^{-5}. A novel method, multi-media-equivalent dose (MMED) was developed that incorporated local exposure parameters. It was used to investigate the impacts of site-specific bioaccessibility (from 6.9% to 51.5%) on the results. The RG of arsenic calculated via MMED was 34.4 mg/kg and 54 mg/kg when bioaccessibility was considered. When integrating 5 exposure parameters across 31 provinces, provincial remediation goals ranged from 15.1-31.7 mg/kg. The RG calculated was more aligned with the practical conditions of managing As-contaminated sites, with the potential for broader implementation across various provinces.

A MULTISPECIES REACTIVE TRANSPORT MODEL OF SEQUENTIAL BIOREMEDIATION AND PUMP-AND-TREAT IN A CHLOROETHENES-POLLUTED AQUIFER

Casiraghi, G., D. Pedretti, G.P. Beretta, L. Cavalca, S. Varisco, and M. Masetti.
Water, Air & Soil Pollution 236(54)(2025)

A multispecies reactive transport model was developed to reproduce a sequential bioremediation system (SBS) and coupled to a pump-and-treat system in a chloroethene-polluted alluvial aquifer in Northern Italy. Two different model configurations were created to study the importance of adopting a more homogeneous or heterogeneous spatial distribution of transport parameters. The first configuration embedded 3 different reaction zones (RZs), each one described by spatially invariant first-order reaction rates (k) simulating parent-daughter transformation of chloroethenes (PCE→TCE→DCE→VC). The second configuration embedded a spatially variant distribution of reaction rates within the three RZs, resulting in a more heterogeneous parametrization. Given the larger number of fitting parameters, the more heterogeneous model provided a better match of the field observations. Compared to it, calibrated k obtained from the more homogeneous model was largely underestimated for PCE and TCE and overestimated for less-chlorinated compounds. The heterogeneous model showed that the SBS's capacity to degrade the chemicals varied significantly across the different site areas, a feature not captured by the homogeneous model that could have important implications regarding the potential closure of selected P&T wells.

COMPARISON OF ENVIRONMENTAL FOOTPRINT FOR PER- AND POLYFLUOROALKYL SUBSTANCES LIQUIDS AND SOLIDS TREATMENT TECHNOLOGIES

Molzahn, P., B. Collins, and W. DiGuiseppi. | Remediation 35(1):e70002(2024)

A comparison study was conducted of a wide range of PFAS treatment technology types for both liquids and solids operating under limited but realistic hypothetical scenarios. The results include the approximate expected greenhouse gas (GHG) emissions of each technology type and scenario, compared to one another for the treatment of PFOS and PFOA. The liquid treatment technology types considered were technologies that concentrate or separate PFAS from liquid media (such as ion exchange, granular activated carbon, and foam fractionation), technologies that destroy PFAS (such as supercritical water oxidation and electrochemical oxidation), and landfill disposal via solidification. Remedial solutions that include both a concentration/separation step and a destruction step were not evaluated in this comparison. The solids treatment technologies included thermal desorption, soil washing, soil stabilization, and excavation and disposal at a landfill. The factors included in each scenario were material production, material and equipment transportation, equipment and energy use, and material disposal, as these were considered to be the largest contributors to GHG emissions.

INTEGRATED SITE CLOSURE BASED ON NATURAL ATTENUATION

Hers, I. and I. Mitchell. | RemTech 2024: Remediation Technologies Symposium, 16-18 October, Banff, Alberta, Canada, 27 slides, 2024

Available models to predict source depletion are evaluated with example comparisons of mass loss to field literature data. Case studies were presented in multiple settings, illustrating the use of the approaches within a standardized framework and available tools to minimize the need for remediation, reduce or eliminate the need for active monitoring, and transition sites to a passive control or no further action state. The immediate benefits available by applying this approach include accelerating redevelopment of properties and maximizing commercial use, redeployment of spend from further assessment to remediation/environmental protection, and streamlining regulatory review and resubmissions. https://esaa.org/wp-content/uploads/2024/10/RT2024-Hers.pdf

CITY-SCALE IMPACTS OF PFAS FROM NORMAL AND ELEVATED TEMPERATURE LANDFILL LEACHATES ON WASTEWATER TREATMENT PLANT INFLUENT

Collins, A., M.J. Krause, S.M. Bessler, A. Brougham, T. McKnight, T. Strock, and M. Ateia.
Journal of Hazardous Materials 480:136270(2024)

A study systematically examined the compositions and concentrations of PFAS and precursors content in normal and elevated temperature landfill (ETLF) leachates and compared them to municipal wastewater and a wastewater treatment plant (WWTP) influent with and without introduced leachates. Characterization of the samples involved the analysis of 71 PFAS target compounds before and after applying the TOP assay, along with measuring fluorotelomer

alcohols and adsorbable organofluorine (AOF) levels. Summed PFAS concentrations in leachates were driven largely by fluorotelomer carboxylic acids, short-chain and ultrashort-chain perfluorinated carboxylic acids, and sulfonic acids. Summed PFAS concentrations in ETLF leachate were significantly higher than in normal leachate for precursors and terminal PFAS products. TOP assay data demonstrated that ETLF leachate contained significantly higher oxidizable PFAS precursor concentrations than normal leachate. PFAS profiles in leachates were distinct from municipal wastewater and WWTP influent, suggesting diverse PFAS inputs to the WWTP. The presence of unknown precursors revealed by the TOP assay and AOF analyses highlights the complexity of PFAS sources impacting sewer networks, warranting further study to better characterize PFAS inputs to the WWTP on a city-wide scale.

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General News

ADVANCING PFAS REMEDIATION THROUGH PHYSICS-BASED MODELING OF 2D MATERIALS: RECENT PROGRESS, CHALLENGES, AND OPPORTUNITIES

Kazi, M., S. Varghese, N. Sarker, N. Aich and V. Gadhamshetty.
Industrial & Engineering Chemistry Research 64(4):1894-1906(2025)

A study proposed leveraging physics-based machine learning (PBM) models to accelerate the discovery and optimization of 2D materials for PFAS treatment, particularly through adsorption and electrochemical degradation. The integration of fundamental physical laws with machine learning in an inverse PBM framework enables faster, more cost-effective predictions of material properties tailored to PFAS remediation. The article highlights recent advancements in 2D materials, such as graphene, MXenes, and boron nitride, and their potential applications in environmental remediation. The approach can provide scalable, high-performance solutions to address the global PFAS contamination crisis, offering a path forward in developing advanced materials for sustainable water treatment technologies.

POINT OF ENTRY TREATMENT FOR DRINKING WATER

U.S. Army Corps of Engineers, the Naval Facilities Engineering Systems Command, and the Air Force Civil Engineer Center. Section 02 72 13.13, 40 pp, 2025

This guide specification covers the requirements for drinking water treatment via a point of entry treatment (POET) system. https://www.wbdg.org/FFC/DOD/UFGS/UFGS%2002%2072%2013.13.pdf

IN-SITU THERMAL REMEDIATION

U.S. Army Corps of Engineers, the Naval Facilities Engineering Systems Command, and the Air Force Civil Engineer Center. Section 02 53 16.16, 39 pp, 2025

This guide specification covers the requirements for in situ thermal remediation (ISTR) of materials contaminated by hazardous or toxic organic wastes and/or by petroleum, oil, or lubricants (POL). The ISTR can be achieved by electrical resistance heating, thermal conduction heating, or steam-enhanced extraction. Site-specific criteria for temperature, mass removal, target treatment zone (TTZ), and treatment of extracted fluids would be determined and presented in this specification. https://www.wbdg.org/FFC/DOD/UFGS/UFGS%2002%2053%2016.16.pdf

DETERMINING PFAA PLUME STABILITY CONDITION QUICKLY AND EFFICIENTLY

McHugh, T.E., D.T. Adamson, B.W. Actkinson, and C.J. Newell.
Groundwater Monitoring & Remediation 45(1):68-79(2025)

This paper explores the difficulties in determining plume stability conditions and presents four tools to evaluate stability conditions more quickly and efficiently: (1) high-resolution spatial sampling, (2) high-volume sampling, (3) passive integrative samplers, and (4) statistically based high-frequency sampling. Employing these tools allows site managers to optimize monitoring strategies to quickly discern if and how much PFAA plume expansion is occurring and make timely informed decisions regarding PFAA plume management.

AQUIPARAMETER—A NOVEL INTERACTIVE WEB-BASED TOOL FOR STATISTICAL ASSESSMENT OF HYDROGEOLOGICAL PARAMETERS

Baez-Reyes, H. and A. Hernandez-Espriu. | Groundwater 63(1):10-13(2025)

AquiParameter is a free online platform that provides ~6,000 records of hydrogeological variables, such as hydraulic conductivity, total and effective porosity, rock compressibility, specific yield, and storage coefficient comprising rocks, and unconsolidated geological materials (https://aquiparameter.ingenieria.unam.mx/). It is a user-friendly, straightforward web platform designed to rapidly access numerous hydrogeological values and subsequent statistical evaluation without prior knowledge of coding, programming, or advanced database management. The accessibility makes *AquiParameter* particularly advantageous for groundwater project managers and practitioners, students, teachers, and researchers.
https://ngwa.onlinelibrary.wiley.com/doi/epdf/10.1111/gwat.13448
AquiParameter tool: https://aquiparameter.ingenieria.unam.mx/

ADVANCES IN WASTE-DERIVED FUNCTIONAL MATERIALS FOR PFAS REMEDIATION

Andleeb, S., M. Irfan, E. Atta-Obeng, and D. Sukmawati. | Biodegradation 36(13)(2025)

This review highlights advancements in using agricultural, industrial, and biological waste-derived materials for sustainable PFAS remediation. Innovative modification techniques like hydrothermal synthesis, pyrolysis, calcination, co-precipitation, the sol-gel method, and ball milling are discussed. The study also examines adsorption mechanisms, factors affecting adsorption efficiency, and the technological challenges in scaling up waste-derived material use.

ASSESSMENT OF INNOVATIVE TECHNOLOGIES FOR HAZARDOUS WASTE TREATMENT AND REMEDIATION REVIEW: A SUSTAINABLE APPROACH FOR ENVIRONMENTAL PROTECTION

Sharma, P., N. Nagabhooshanam, A. Singh, M. Khurana, and M.P.S. Raju. | Global Nest 26(7):05950(2024)

A study investigated various innovative methods (advanced oxidation processes, bioremediation techniques, nanotechnology applications, and green chemistry strategies) that offer promising opportunities to address hazardous waste contamination while minimizing resource consumption and environmental footprints. It provides a comprehensive review of existing literature, case studies, and technical reports to gather insights into the performance, cost-effectiveness, and environmental benefits, placing special emphasis on evaluating their applicability across different types of hazardous waste, ranging from industrial chemicals and pollutants to electronic waste and persistent organic pollutants. The study also analyzes regulatory frameworks, policy implications, and socio-economic factors influencing the adoption and implementation of these technologies in diverse industrial sectors and geographical regions. The findings will contribute to advancing sustainable approaches for addressing hazardous waste challenges, promoting environmental protection, and fostering a circular economy mindset in waste management practices.
https://journal.gnest.org/system/files/2024-08/gnest_05950_final.pdf

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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