Entries for January 1-15, 2025

Market/Commercialization Information

A -- ENVIRONMENTAL SECURITY TECHNOLOGY CERTIFICATION PROGRAM (ESTCP) - ENVIRONMENTAL TECHNOLOGY DEMONSTRATIONS (SRCSGT)
US Army Corps of Engineers, Humphreys Engineer Center Support Activity, Alexandria, VA
Contract Opportunities on SAM.gov W912HQ25S0002, 2025

The Environmental Security Technology Certification Program (ESTCP) is the DoD's demonstration and validation program for environmental and installation energy technologies. ESTCP is seeking proposals for innovative environmental and installation energy technology demonstrations as candidates for funding beginning in Fiscal Year (FY) 2026. Descriptions of the topic areas and complete solicitation details are on the ESTCP website at https://serdp-estcp.mil/workwithus. ESTCP projects must execute the technology demonstration to validate the technology's performance and expected operational costs; transfer the technology and provide data and support to achieve regulatory and end-user acceptance. Awardees under this Broad Agency Announcement (BAA) will be selected through a multi-stage review process. The technical review includes a brief pre-proposal, a full proposal, and an oral presentation. Based upon the pre-proposal evaluation by ESTCP, each proposer will be notified as to whether ESTCP requests or does not request the submission of a full proposal. Those proposers who are invited to submit full proposals, but who do not have a DoD partner or a DoD demonstration site, will be assigned a DoD liaison to assist in the identification of an appropriate demonstration site. Each full proposal will be presented in person to the ESTCP Technical Committee. To be eligible for consideration, parties wishing to respond to this announcement must submit a pre-proposal via SEMS in accordance with the instructions on the website, no later than 2:00 P.M. ET on March 6, 2025. https://sam.gov/opp/f14h9ab859e64460ac097015e48c6c84/view

Z -- ENVIROMENTAL REMEDIAL ACTION CONTRACT (SOL)
US Department of the Navy, Naval Facilities Engineering Systems Command (NAVFAC), Atlantic Command, Norfolk, VA
Contract Opportunities on SAM.gov N6247024R0072, 2025

This is a total small business set-aside under NAICS code 562910. NAVFAC requires a contractor to primarily support site remediation of NPL and non-NPL sites regulated under CERCLA, RCRA, UST regulations, state-specific regulations, and other sites that might require remedial action. Work under this contract will be performed primarily in AL, AR, CT, DE, FL, GA, IL, IN, KS, KY, LA, ME, MD, MA, MI, MS, MO, NH, NJ, NY, NC, OH, OK, PA, RI, SC, TN, TX, VT, VA, WV, WI, DC, and Puerto Rico, may include BRAC Program and Non-CERCLA sites throughout NAVFAC Atlantic's area of responsibility, and may cover any Naval or Marine Corps activity in the area of and anywhere outside of NAVFAC Atlantic's area of responsibility. Potential tasks are discussed in the solicitation. The contractor is responsible for identifying and obtaining permits and licenses required by current laws and regulations. Expedited fast action/emergency response work may be performed. The Government will award a cost-reimbursable contract to the responsible offeror whose proposal conforming to the solicitation will be a best value to the Government, technical factors, past performance, and cost considered. Offerors submitting proposals will not be compensated for any expenses incurred in the preparation of their proposal. Offers are due by 5:00 PM EST on February 24, 2025. https://sam.gov/opp/be2e6f9bd34h23a89536a627c1688f/view

F -- SPE603-25-R-0503 DFSP NORWALK AND DFSP SAN PEDRO ENVIRONMENTAL SERVICES (SOL)
US Department of Defense, Defense Logistics Agency Energy, Fort Belvoir, VA
Contract Opportunities on SAM.gov SPE603-25-R-0503, 2025

This is a full and open competition under NAICS code 562910. Defense Logistics Agency Energy requires a contractor to provide remediation, compliance, and facility maintenance services at DFSP Norwalk and DFSP San Pedro in the Los Angeles Metropolitan Area, California. The general scope and magnitude of this requirement includes, or is related to the following: 1) Project Management/Contract Management; 2) Site investigation, risk assessment, evaluation of remedial alternatives, and selection of remedial action; 3) Environmental Remediation Systems installation/construction and Operation and Maintenance (O&M) at the Site; 4) Monitoring and Reporting of Site Environmental Conditions; 5) Public involvement; 6) Records and Data Management; 7) Emergency Response Event Evaluation; 8) Environmental Compliance Support; and 9) Environmental Facility Maintenance Activities. The contract objectives are to protect human health and the environment through the management, operation, maintenance, and monitoring of contaminant recovery systems, and restoration of environmental media (e.g. surface water, groundwater, soil, or air) at each Facility, as required by applicable federal, state, or local regulations and DoD policy. The Government anticipates awarding two (2) indefinite-delivery indefinite-quantity firm-fixed-price contracts, one for each location. The period of performance will be July 1, 2025, through June 30, 2029 and a six-month option extension provision of July 1, 2029, through December 31, 2029. Offers are due by 3:00 PM EDT on March 26, 2025. https://sam.gov/opp/3756bf9a9c014fa8b0b6f3c25d0b1f2a/view

R -- R7 START VI: SUPERFUND TECHNICAL ASSESSMENT & RESPONSE TEAM 6 (PRESOL)
US Environmental Protection Agency, Region 7 Contracting Office, Lenexa, KS
Contract Opportunities on SAM.gov 68HE0725R0002, 2025

When this solicitation is released on or about March 7, 2025, it will be competed as a full and open competition under NAICS code 541620. EPA Region 7 requires a contractor to provide nationally consistent services to the EPA OSCs and other federal officials implementing EPA's responsibilities under the National Response System. 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. The contractor shall provide scientific/technical support for EPA activities in furtherance of the agency's primary mission and advisory and assistance services to other programs, such as Brownfields and remedial support services, when other available contracting mechanisms for those services are unavailable or impracticable. Contract responsibilities include providing: 24-hour, 7-days-a-week response activities, including emergency, counterterrorism, oil spill, federal disaster, PRP, and minor containment response, and fund-lead removals; Preparedness and Prevention Activities; Assessment/Inspection Activities; Technical Support Activities; Data Management and Mapping Support; and Training. It is the Government's intent to award one, Fixed Unit Rate Indefinite Delivery/Indefinite Quantity (IDIQ) contract with a three-year base period with two two-year options for a total possible period of 7 years. The estimated ceiling is expected to be between $75 - $100 million for the 7-year period. The award will be made on a best value/tradeoff basis. There is no solicitation at this time. https://sam.gov/opp/bch51h5b7c3b4he9bf030bd89a1a12cf/view

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Cleanup News

ELECTRICAL RESISTIVITY TOMOGRAPHY MONITORING OF IN SITU SOIL FLUSHING AT THE HANFORD 100-K EAST AREA 100KE SOIL FLUSHING MONITORING
Johnson, T., J. Thomle, J. Robinson, and R. Mackley. Report PNNL-35781, 46 pp, 2024

In situ soil flushing was tested at the Hanford 100-KE Area to accelerate the removal of residual Cr(VI) in the vadose zone using 3D time-lapse electrical resistivity tomography (ERT) to monitor the distribution of flush water. Results of 3D time-lapse ERT imaging during two separate soil flushing campaigns generally show that:

1. Pit backfill materials appear to have larger permeability than native (undisturbed) soils. Consequently, the boundary between pit backfill and native soil had a significant impact on flush water migration, causing some flush water to migrate along the pit boundary toward the bottom of the pit.
2. Non-uniform flows, likely caused by variations in physical or hydraulic properties in the pit backfill materials, resulted in uneven flush water distribution on the southern margin of the soil flushing zone.
3. Redistribution of water at the interface between backfill materials and the underlying Hanford formation sediments likely facilitated enhanced flushing within native soils beneath the deeper parts of the pit boundary, which presumably overlie soils with elevated Cr(VI) contamination. These areas appear to have been infiltrated by higher volumes of flush water than the northern and southern margins of the flush zone.
4. Compared to 2022, high flush water application rates in 2023 significantly improved flush water distribution throughout the target flushing zone.
5. Imaging resolution was limited to a depth of ~20 meters below the ground surface due primarily to limitations on the lateral extent of the surface ERT array (depth of investigation is proportional to the lateral footprint of the ERT array). The ~10-m region of the vadose zone between ~130 meters elevation and the water table at ~120 m elevation was unresolved.

https://www.osti.gov/servlets/purl/2350937

LONG-TERM LEGACY OF PHYTOREMEDIATION ON PLANT SUCCESSION AND SOIL MICROBIAL COMMUNITIES IN PETROLEUM-CONTAMINATED SUB-ARCTIC SOILS
Leewis, M.C., C. Kasanke, O. Uhlik, and M.B. Leigh. | Soil 10:551-566(2024)

A phytoremediation study was initiated in 1995, near Fairbanks, Alaska, to determine how the introduction of annual grasses and/or fertilizer would influence petroleum hydrocarbon (PHC) degradation. After 1 year, grass and/or fertilizer-treated soils showed greater decreases in PHC concentrations compared to untreated plots. The site was then left for 15 years with no active site management. The site was re-examined in 2011 to explore the legacy of phytoremediation on contaminant disappearance and plant and soil microbial ecology. The recruited vegetation and the current bulk soil microbial community structure and functioning were all heavily influenced by initial phytoremediation treatment. The number of diesel-degrading microorganisms was positively correlated with the percentage cover of vegetation, which was influenced by initial treatment. Fifteen years later, the initial fertilizer use had significant effects on microbial biomass, community structure, and activity. The phytoremediation treatment has long-term, legacy effects on the plant community, impacting microbial community structure and functioning. It is important to consider phytoremediation strategies that not only influence site remediation rates in the short term but also prime the site for long-term restoration of vegetation.

THE TREATMENT OF PFAS-IMPACTED GROUNDWATER USING NOVEL REGENERABLE ION EXCHANGE RESIN: A FIVE-YEAR CASE STUDY
Kempisty, D.M., C. Gordon, J. Haxen, O. Mowla, M.G. Nickelsen, and S. Woodard.
Australian Water E-Journal, 10(3), ISSN 2206-1991, 19 pp, 2024

Regenerable ion exchange resin for PFAS remediation has been used in Australia since 2017. Currently, five regenerable systems are continuously operated for remediation purposes and another regenerable system is providing municipal drinking water treatment. This article provides an update on PFAS treatment using regenerable resin data from bench-, pilot-, and full-scale systems. The paper serves as a state-of-the-science for regenerable resin used in PFAS mitigation operations. Lessons learned from more than 5 years of full-scale operation are shared. A comprehensive breakdown of the total water treated and mass of PFAS removed to date is included. Resin optimization work and data on regeneration efficiency are also discussed. Since 2019, 26 regeneration cycles have been performed at the example site without residual PFAS build-up on the resin. Additionally, no physical breakdown of the resin bead has been observed. From the regeneration perspective, a balance is performed on "mass PFAS removed" and "mass PFAS recovered" during regeneration events. Data is shared to support these observations. https://14568786.fs1.hubspotusercontent-na1.net/hubfs/14568786/Water%20e-journal/2024/Water_E-journal_August_2024_006.pdf

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Demonstrations / Feasibility Studies

NATURAL SOURCE ZONE DEPLETION AND THE ACTIVATED CARBON REMEDY: FRIEND OR FOE
Mazzarese, M. | RemTech 2024: Remediation Technologies Symposium, 16-18 October, Banff, Alberta, Canada, 27 slides, 2024

Field and lab data are presented that show carbon-based injectates reduce LNAPL, demonstrating that activated carbon facilitates biodegradation. Contaminants absorbed into the microporous structure of carbon are bioavailable and biodegradation regenerates the adsorption capacity of the activated carbon. Thus, redistributing LNAPL into the carbon's pore structure is not limited by its initial adsorption capacity. Therefore, activated carbon supports a continuing, physical LNAPL redistribution and biodegradation. A lab study, employing various carbons, blends of commercially available microorganisms purported to degrade petroleum hydrocarbons, and supplements and substrates, was structured to characterize the effects of the elements on gasoline and diesel LNAPL degradation. Three different controls were used to evaluate experimental losses and provide performance profiles for changes due to simple absorption by the activated carbon. The data were then used to derive overall NAPL and compound-specific degradation rates. The test program was structured to examine the individual carbons with the same set of organisms and substrates. Data demonstrated that organic compounds absorbed into the microporous structure of carbon are bioavailable. Extraction of absorbed fuel constituents from the carbon demonstrates LNAPL degradation. A proposed mechanism for LNAPL degradation is supported by the data. After applying a carbon-based injectate remedy, NSZD is supported through continued LNAPL redistribution and biodegradation. https://esaa.org/wp-content/uploads/2024/10/RT2024-MAZZARESE.pdf

COMPARING CONVENTIONAL AND PHYTOSCREENING METHODS TO DETECT SUBSURFACE CHEMICAL CONTAMINANTS: A TEST CASE OF VOLATILE ORGANIC COMPOUNDS IN AN URBAN SETTING
O'Leary, B.F., C.J. Miller, K. Selegean, and G.R. Hood.
Environmental Pollution 365:125374(2025)

The concentration of six VOCs, including BTEX, PCE, and TCE, detected in conventional media (soil, soil vapor, groundwater, sewer vapor) and different plant tissue (tree core, leaf, root, shoot) were sampled and compared at an abandoned gas station with a leaking UST and a former dry cleaning facility in Detroit. Results suggest that the VOC concentrations detected in plants are similar to or, in some cases, greater than conventional methods and can differ across the growing season. For example, on average, leaves and roots detected a higher VOC concentration than shoots and tree cores. However, TCE and PCE were generally higher in soil and soil vapor. The frequency at which conventional versus phytoscreening methods failed to detect VOCs was similar at one site and higher at another, suggesting that phytoscreening may yield fewer non-detects at known contamination sites. While additional work is needed to understand the relationship between concentrations of VOCs detected in soil versus co-located plant samples, results suggest that phytoscreening may be a viable and reliable method to detect belowground chemical contaminants while reducing screening times and cost and increasing access to private property. https://www.sciencedirect.com/science/article/pii/S0269749124020918/pdfft?md5=f725e7467b5cd5da7ae559c839e60a82&pid=1-s2.0-S0269749124020918-main.pdf

DEVELOPMENT OF A NOVEL DGT PASSIVE SAMPLER FOR MEASURING POLYCYCLIC AROMATIC HYDROCARBONS IN AQUATIC SYSTEMS
Rong, Q., Y. Li, J. Luo, L. Yan, K.C. Jones, and H. Zhang.
Journal of Hazardous Materials 470:134199(2024)

A novel diffusive gradients in thin-films (DGT) passive sampler, made of metal and suitable for sampling hydrophobic organic compounds, was designed and tested to measure PAHs. Based on well-known DGT principles, the sampler pre-concentrates PAHs with typical deployment times of days/weeks with minimal sample handling. They minimize sorption and sampling lag times. An MIP-DGT was preferred following tests on different binding layer resins. It samples PAHs independent of pH (3.9-8.1), ionic strength (0.01-0.5 M) and dissolved organic matter <20 mg/L, making it suitable for applications across a wide range of environments. Field trials in river water and wastewater demonstrated that DGT is a convenient and reliable tool for monitoring labile PAHs, readily achieving quantitative detection of environmental levels (sub-ng and ng/L range) when coupled with conventional GC-MS or HPLC. https://www.sciencedirect.com/science/article/pii/S0304389424007787/pdfft?md5=03b590d3d5c5c98406441f6685dd8999&pid=1-s2.0-S0304389424007787-main.pdf

ASSESSMENT OF PERFLUOROALKYL AND POLYFLUOROALKYL SUBSTANCES (PFAS) MASS FLUX AND DISTRIBUTIONS IN A LAKE SYSTEM USING SEDIMENT BED PASSIVE FLUX METERS AND CERAMIC DOSIMETERS
Haluska, A., A. Meder, B. Susset, K. Rohler, R. Seelig, A. Ershadi, J. Cho, M.D. Annable, and P. Grathwohl. | Groundwater Monitoring & Remediation 44(4):38-52(2024)

A field study demonstrated the feasibility of deploying ceramic dosimeters and Sediment Bed Passive Flux Meters (SBPFMs) to assess time-integrated PFAS concentrations and fluxes, respectively, at a PFAS-contaminated lake near Baden-Baden, Germany. Long-term surface water grab samples detected PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFNA, PFDA, PFBS, PFHxS, and PFOS at a total concentration of ~1µg/L. Dosimeters deployed for 66 and 126 d resulted in detected concentrations ranging from ~250 to 380 ng/L and 120 to 460 ng/L, respectively. The 66 d deployment resulted in detected concentrations of PFPeA, PFHxA, PFHpA, and PFOA. The 126 d deployment resulted in additionally detected concentrations of PFBA, PFNA, PFDA, PFUnDA, PFDoDA, PFTeDA, PFBS, PFPeS, PFOS, PFNS, and PFDS. SBPFMs resulted in detected concentrations of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFNA, PFUnA, PFTrDA, and PFBS and determined a total mass discharge of 5.6g/d into the lake. Overall, dosimeters and SBPFMs are more sensitive than grab samples at detecting PFAS at low concentrations and can be used to better understand the spatial distribution of PFAS in a lake system. https://ngwa.onlinelibrary.wiley.com/doi/epdf/10.1111/gwmr.12665

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Research

MODELING AND EVALUATION OF PFOS RETENTION IN THE UNSATURATED ZONE ABOVE THE WATER TABLE
Hort, H.M., E.B. Stockwell, C.J. Newell, J. Scalia IV, and S. Panday.
Groundwater Monitoring & Remediation 44(3):38-48(2024)

PFAS retention in the unsaturated zone above the water table was examined using a mathematical model, MODFLOW-USG-Transport PFAS or "USGT-PFAS," which incorporates adsorption onto air-water interfaces, providing a more comprehensive understanding of PFAS retention near the water table and release to groundwater. Modeling of a hypothetical PFOS site under various idealized site conditions illustrated that the impacts on PFOS retention from smallest to largest were water table fluctuations, low episodic recharge, constant recharge, moderate episodic recharge, constant recharge with water table fluctuations, and high episodic recharge. PFOS retention also varied by sand type, with greater retention occurring in simulations incorporating coarse sand with low capillary potential versus fine sand with high capillary potential. PFAS management strategies were also explored, including the adaptation of gas sparging. Model simulations for a simplified hypothetical site demonstrated that PFAS can be substantially retained in the unsaturated zone once gas sparging results in an upward PFAS concentration in groundwater and the unsaturated zone near the water table. Modeling can aid in understanding PFAS behavior but requires simulating multiple interrelated processes to correctly predict PFAS fate and transport in subsurface conditions.

COMPLEMENTARY FIELD AND LABORATORY BATCH STUDIES TO QUANTIFY GENERATION RATES OF PERFLUOROALKYL ACIDS IN A CONTAMINATED AGRICULTURAL TOPSOIL WITH UNKNOWN PRECURSORS
Haluska, A.A., K. Rohler, J. Fabregat-Palau, D.A.M. Alexandrino, S. Abramov, K.J. Thompson, D. Straub, S. Kleindienst, B. Bugsel, J. Zweigle, C. Zwiener, and P. Grathwohl.
Groundwater Monitoring & Remediation 44(3):61-75(2024)

Soil microbiome changes and generation rates of PFAS precursors were studied in a contaminated agricultural field in Brilon-Scharferberg, North Rhine-Westphalia, Germany, using field and lab batch microcosm studies. 16S rRNA gene amplicon sequencing was used to track how microbial community composition changed over time. PFAA generation rates were quantified using field and batch incubations combined with the direct total oxidizable precursor (dTOP) assay. Generation rate constants of these short-chain PFAA estimated from batch incubations (0.12 to 0.75 1/year) were higher but similar to rate constants from the field (0.05 to 0.22 1/year). Long-term mass discharge data (2009 to 2023) suggest that at least 60 years are needed to remove 99.99% of short-chain PFAA and their precursors. 16S rRNA gene amplicon sequencing data revealed a major impact of PFAAs on the biodiversity of soil microorganisms, with batch-incubated contaminated soil showing higher richness and diversity indexes than field control soil. However, most of these impacts occurred at lower taxonomical ranks and did not seem to have a prominent impact on the overall structure of the autochthonous microbial communities of the soils where PFAAs were produced and accumulated. Results show that well-controlled aerobic batch tests combined with dTOP assay results are suitable for estimating short-chain PFAA generation rates https://ngwa.onlinelibrary.wiley.com/doi/epdf/10.1111/gwmr.12680

THE UNIQUE DISTRIBUTION PATTERN OF PFAS IN LANDFILL ORGANICS
Saha, B., M. Ateia, T. Tolaymat, S. Fernando, J.R. Varghese, D. Golui, A.N. Bezbaruah, J. Xu, N. Aich, J. Briest, and S. Md Iskander.
Journal of Hazardous Materials 479:135678(2024)

PFAS were analyzed across various depths and seven spatially distinct locations within a municipal landfill. The measured PFAS concentrations in organics ranged from 6.71 to 73.06 µg/kg, a sum of 29 PFAS from six classes. PFCAs and fluorotelomer carboxylic acids (FTCAs) were dominant, constituting 25-82% and 8-40% of total PFAS at different depths. PFBA was the most dominant PFCA with a concentration range of 0.90-37.91 µg/kg. 5:3 FTCA was the most prevalent FTCA with a concentration of 0.26-17.99 µg/kg. A clear vertical distribution of PFAS was observed with significantly greater PFAS concentrations at the middle depths (20-35 ft) compared to the shallow (10-20 ft) and high depths (35-50 ft). A strong positive correlation (r > 0.50) was noted between total PFAS, total carbon, and dissolved organic matter in landfill organics. Multivariate statistical analysis inferred common sources and transformations of PFAS within the landfill. The study underscores the importance of a system-level analysis of PFAS fate in landfills, considering waste variability, chemical properties, release mechanisms, and PFAS transformations.

ELECTRICAL CONDUCTIVITY PROFILING FOR RAPID CONTAMINATION ASSESSMENT IN UNSATURATED ZONES: A CASE STUDY OF AN MSW LANDFILL
Singh, P., D.K. Haritwal, S. Seth, G.V. Ramana, and M. Datta.
Science of The Total Environment 951:175773(2024)

A study investigated the potential of using bulk soil electrical conductivity (EC_{bulk}) to predict pore water conductivity (EC_{pw}) for assessing contamination in the unsaturated zone of an old municipal solid waste landfill in Bhalswa, Delhi. EC_{bulk}, EC_{pw}, and water content were evaluated with depth using the Hydraulic Profiling Tool (HPT) and a dual tube soil sampling system, supplemented by a cone penetration test (CPTu) for high-resolution soil type identification. The correlation of EC_{bulk} with EC_{pw} was primarily influenced by volumetric water content and mineral conductivity, the latter being negligible at the site due to the high leachate conductivity. A reasonable linear correlation between normalized EC (EC_{bulk}/EC_{pw}) was observed with volumetric water content, except at low water content. EC_{bulk} and EC_{pw} profiles with depth indicated attenuation of contaminants in clay layers, while sand layers exhibited constant profile with depth. EC_{pw} was contributed by macro ions generally found in the leachate, including Na^+, Mg^{2+}, K^+, Ca^{2+}, NH_4^+, Cl^-, SO_4^{2-}, and HCO_3^-, as demonstrated by a strong correlation with their cumulative ionic strength. Results indicate that EC_{bulk} profile can be used as a rapid semi-quantitative method for assessing contaminant migration in the unsaturated soil zone, supporting the remediation or control strategies at old landfills.

DETERMINATION OF POLYCYCLIC AROMATIC HYDROCARBONS, PHTHALATE ESTERS, ALKYLPHENOLS AND ALKYPHENOL ETHOXYLATES IN SEDIMENT USING SIMULTANEOUS FOCUSED ULTRASOUND SOLID-LIQUID EXTRACTION AND DISPERSIVE SOLID-PHASE EXTRACTION CLEAN-UP FOLLOWED BY LIQUID CHROMATOGRAPHY
Brenkus, M., P. Tolgyessy, V. Koperova Navojova, M. Kirchner, and S. Hrouzkova.
Microchemical Journal 200:110299(2024)

A study presents a simple and non-laborious method to analyze 16 PAHs, 2 phthalate esters (PEs), 2 alkylphenols (APs), and 4 alkylphenol ethoxylates (APEOs) in sediment. The method employs sample preparation combining focused ultrasound solid-liquid extraction (FUSLE) and in situ cleanup followed by liquid chromatography with fluorescence and ultraviolet detection. Extraction of 0.5 g sediment samples with 7 mL acetone in the presence of activated silica (0.5 g) and powdered copper (0.2 g) using an ultrasonic probe for 1 min resulted in recoveries of target analytes ≥78%. The analytical method was classified as "acceptable green analysis" by the analytical Eco-Scale assessment (AESA) and scored 0.54 in the AGREEprep greenness assessment for sample preparation. Matrix-matched calibration was used to quantify analytes with a linear range for PAHs 2-1000 ng/g, for PEs 100-5000 ng/g, and for APs and APEOs 40-2000 ng/g dry weight. The reached limits of quantification for PAHs ranged from 1.1-3.1 ng/g, for PEs from 122-124 ng/g, for APs from 40-51 ng/g, and for APEOs from 36-53 ng/g. The method's applicability was demonstrated by analyzing real sediment samples and natural matrix-certified reference material.

PREDICTING ABIOTIC TCE TRANSFORMATION RATE CONSTANTS—A BAYESIAN HIERARCHICAL APPROACH
Storiko, A., A.J. Valocchi, C. Werth, and C.E. Schaefer.
Groundwater Monitoring & Remediation 4494:67-79(2024)

Pseudo-first-order rate constants were collected for natural sediments and rocks from the literature, as well as intrinsic (surface-area-normalized) rate constants of individual minerals to assess the variability of abiotic TCE reduction rate constants. A Bayesian hierarchical modeling approach was used to differentiate the contributions of natural variability and experimental error to the total variance. The model also predicted rate constants at new sites, revealing a considerable uncertainty of several orders of magnitude. The study investigated whether incorporating additional information about sediment composition could reduce this uncertainty. Two predictors were tested: reactive mineral content (measured by X-ray diffraction) combined with surface areas and intrinsic rate constants or the extractable Fe(II) content. Knowledge of the mineral composition only marginally reduced the uncertainty of predicted rate constants. The low information gain was attributed to the inability to measure the (reactive) surface areas of individual minerals in sediments or rocks, which are subject to environmental factors like aqueous geochemistry and redox potential. In contrast, knowing the Fe(II) content reduced the uncertainty about the first-order rate constant by nearly two orders of magnitude because the relationship between Fe(II) content and rate constants is approximately log-log-linear. Results demonstrate how the approach can estimate the range of cleanup times for a simple example of diffusion-controlled transport in a contaminated aquitard. https://ngwa.onlinelibrary.wiley.com/doi/epdf/10.1111/gwmr.12667

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General News

MAXIMUM CONTAMINANT LEVEL GOALS (MCLGS) FOR THREE INDIVIDUAL PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) AND A MIXTURE OF FOUR PFAS
EPA Office of Water, Office of Science and Technology Health and Ecological Criteria Division, EPA-815-R-24-004, 366 pp, 2024

This document summarizes the health effects, exposure information, and analyses and describes the derivation of EPA's final MCLGs for HFPO-DA (also known as GenX chemicals), PFNA, PFHxS, and PFBS. EPA is finalizing individual MCLGs for HFPO-DA, PFNA, and PFHxS and a PFAS mixture MCLG for mixtures of two or more of four PFAS (HFPO-DA, PFNA, PFHxS, and PFBS) that account for dose-additive health effects when these PFAS co-occur in drinking water. The PFAS mixture MCLG is based on a hazard index. The document also summarizes key elements (e.g., reference doses (RfDs)) from recently published, peer-reviewed, publicly available human health toxicity assessments for HFPO-DA, PFBS, PFNA, and PFHxS that EPA used to develop MCLGs for HFPO-DA, PFNA, and PFHxS and an MCLG for mixtures of two or more of these PFAS plus PFBS. The MCLG represents the level below, which adverse health effects over a lifetime of exposure are not expected to occur, including for sensitive populations and life stages, and with an adequate margin of safety. The document is not intended to be an exhaustive description of all health effects or modeled endpoints nor is it a drinking water health advisory. https://nepis.epa.gov/Exe/ZyPDF.cgi/P101A4NP.PDF?Dockey=P101A4NP.PDF

FILLING THE GAPS IN PFAS DETECTION: INTEGRATING GC-MS NON-TARGETED ANALYSIS FOR COMPREHENSIVE ENVIRONMENTAL MONITORING AND EXPOSURE ASSESSMENT

Newton, S.R., J.A. Bowden, N. Charest, S.R. Jackson, J.P. Koelmel, H.K. Liberatore, A.M. Lin, C.N. Lowe, S. Nieto, K.J.G. Pollitt, A.R. Robuck, P. Rostkowski, T.G. Townsend, M.A.G. Wallace, and A.J. Williams.
Environmental Science & Technology Letters [published 23 January before print]

The performance of GC-MS in non-targeted analysis (NTA) studies shows there is strong potential for applying GC-MS methods to more fully assess the PFAS environmental contamination landscape, shedding light on both known and novel PFAS, especially within the chemical space realm of volatile and semi-volatile PFAS. Waste streams from fluorochemical manufacturing facilities have been heavily studied using LC-MS and targeted GC-MS; however, GC-NTA is needed to discover novel PFAS that are not amenable to LC-MS emitted from facilities. GC-NTA has the potential to elucidate transformation products formed when PFAS are incinerated and is needed to understand air emissions of PFAS and PFAS transformation products from wastewater treatment plants and landfills. Consumer products are known to lead to indoor exposures to PFAS via emissions to air and dust, but research in this area has either used LC-MS or targeted GC-MS.

USING INTELLEKT[EIG] TO SUPPORT REGULATORY CLOSURE IN SASKATCHEWAN

Lavoie, H., J. Paslawski, and J. Gould. | RemTech 2024: Remediation Technologies Symposium, 16-18 October, Banff, Alberta, Canada, 14 slides, 2024

IntelleKt[EIG] software is a cloud-based solution for the environmental industry that allows immediate access to environmental data and controls who accesses the data; reduces spend through improved efficiencies in data warehousing, retention and aggregation; automates reporting; improves agility, which allows organizations to quickly adapt to changing business needs; and eliminates do-overs and costs associated with attrition while getting to closure faster when managing long-term environmental projects. This presentation discusses the process and a suite of tools that have been developed for contaminated sites management. Included in IntelleKt[EIG] are several tools that were developed to quickly and efficiently screen contaminated sites to optimize liability reduction strategies. It provides a series of interactive visualization modules to analyze soil, groundwater, surface water, and any other regulated environmental media and simplifies complex guideline selection for effective data interpretation. Guidelines can be applied for regulatory region, site-specific land use and input variables with each region or regulatory jurisdiction, including site-specific calculated guidelines. IntelleKt[EIG] includes the Environmental Data, Collection, Automation and Analytics database and data model, and several applications, including the Site Assessment Tool, the Natural Attenuation Tool, and the Low Probability Receptor Tool. The data model is compatible with the most used databases provided by analytical labs. The presentation also covers the use of an application with the NAT module as a means to delineate contaminants of potential concern at challenging brownfield sites in urban settings. This approach helps meet regulatory requirements for site closure, where one of the key criteria for closure is the delineation of contaminants to a numerical standard.
Slides: https://esaa.org/wp-content/uploads/2024/10/RT2024-Paslawski.pdf
Longer Abstract: https://esaa.org/wp-content/uploads/2024/09/RT2024-program-Abstracts-39.pdf

SOURCE IDENTIFICATION AND DISTRIBUTION OF PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) IN THE FRESHWATER ENVIRONMENT OF THE USA

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This review provides an in-depth assessment of the distribution of commonly detected PFAS in surface water within five distinct US regions, aims to identify the key sources that contribute to the presence of PFAS and pinpoint data gaps in specific states, emphasizing the need for further research. The Southeastern region, particularly the states of FL, SC, NC, and VA, has been observed to show a higher degree of PFAS contamination. CA, CO, NV, and MT in the Western region, as well as MD, NJ, NY, and NH in the Northeast region, also showed a higher presence of PFAS. In the Southwest region, a significant lack of data was identified, while in the Midwest, except for Michigan, a comparatively lower amount of PFAS in surface water was observed. Including more PFAS in addition to the few commonly studied is expected to increase the total concentration of PFAS, which aids in understanding the actual degree of PFAS pollution. The synthesis of fluoropolymers and the incorporation of PFAS in the manufacturing and production of consumer goods, together with the utilization of fluorinated AFFF, have been recognized as notable sources of PFAS. Possible strategies to decrease and eliminate PFAS from the US are also discussed.