Technology Innovation News Survey

Entries for June 16-30, 2020

Market/Commercialization Information

CHEROKEE COUNTY-TREECE OU4-WEBBER MINE REMEDIAL ACTION
U.S. EPA, Region 7 Contracting Office, Lenexa, KS.
Contract Opportunities at Beta.SAM, Solicitation 68HE0720R0047, 2020

This acquisition of remedial action services is issued as a woman-owned small business (WOSB) set-aside under NAICS code 562910. The following tasks shall be performed at the Webber Mine Complex remediation site located within the Treece OU 4: Task 1 - Site preparation and general activities; Task 2 - Sediment ponds dredging, riprap for rock-lined ditches, and reshaping and regrading of the three sediment ponds; Task 3 - Mine waste removal requirements (screening for Cd, Pb, Zn), grading, and consolidation; Task 4 - Mine waste covering; Task 5 - Erosion and sediment controls; Task 6 - Regrading and restoration; Task 7 - Revegetation; Task 8 - Fill mine shafts, vent pipes, small subsidence pits, and wells; Task 9 - Surveys; and Task 10 - Deliverables. Details are available only on FedConnect at https://www.fedconnect.net/FedConnect/?doc=68HE0720R0047&agency=EPA. Offers are due by 11:59 PM ET on August 17, 2020. https://beta.sam.gov/opp/e0cb78677a2a4e76aa2630ad71af7441/view

ORONOGO-DUENWEG REMEDIATION AND REPAIR
U.S. EPA, Region 7 Contracting Office, Lenexa, KS.
Contract Opportunities at Beta.SAM, Solicitation 68HE0720R0048, 2020

This acquisition is set aside for HUBZone concerns under NAICS code 562910. The project calls for contractor services to regrade and restore three properties previously remediated within OU-1 of the Oronogo-Duenweg Mining Belt Superfund site and to remediate mine waste area MW34. Details for the Oronogo-Duenweg remediation and repair site-specific contract are available only on FedConnect at https://www.fedconnect.net/FedConnect/?doc=68HE0720R0048&agency=EPA. Offers are due by 11:59 PM ET on August 24, 2020. https://beta.sam.gov/opp/1fe0eac2d8ca47faaecd90c270e61a47/view

UNEXPLODED ORDNANCE (UXO) CLEARANCE AT FORT MCCOY, WI
Contract Opportunities at Beta.SAM, Solicitation W911SA-21-Q-3008, 2020

This solicitation is set aside for service-disabled veteran-owned small businesses (SDVOSB) under NAICS code 562910. Contractor shall provide surface and subsurface operational range clearance at Fort McCoy, Wisconsin, to include explosive ordnance disposal and range scrap and residue inspection, certification, removal, and disposal in accordance with applicable DoD, DA, and facility guidance. Most of the locations are challenged by unimproved lands, high noise levels, extremes in weather conditions (temperatures, storms), dust and dirt that require the following of established safety procedures and wearing of protective equipment. Work sites are remote with limited if any permanent latrine facilities. A single firm-fixed-price IDIQ contract will be awarded for this acquisition. Period of performance is 1 February 2021 to 31 March 2022 with four one-year options and a 6-month option to extend. All questions must be furnished to the Contract Specialist in writing by 10:00 AM CT on August 12, 2020, to ensure a timely response. Offers are due by 10:00 AM CT on August 27, 2020. https://beta.sam.gov/opp/878619c636c04221ba326450b424c337/view

FY2021 SUPPORTING EQUITABLE DEVELOPMENT AND ENVIRONMENTAL JUSTICE IN BROWNFIELDS COMMUNITIES
Environmental Protection Agency Funding Opportunity EPA-OLEM-OBLR-20-04, 2020

U.S. EPA announces the availability of funds and solicits applications from eligible entities, including nonprofit organizations, to provide technical assistance to communities on the integration of environmental justice and equitable development when developing solutions to brownfields cleanup and revitalization challenges. See details at https://www.epa.gov/sites/production/files/2020-07/documents/20-04.pdf. A single cooperative agreement is anticipated out of total estimated program funding of $600,000, funded incrementally on an annual basis over three years. The closing date for applications is September 21, 2020. https://www.grants.gov/web/grants/view-opportunity.html?oppId=328283

GREAT LAKES RESTORATION INITIATIVE REQUEST FOR APPLICATIONS
Environmental Protection Agency Funding Opportunity EPA-R5-GL2020-FMSP, 2020

U.S. EPA solicits applications from eligible entities for a cooperative agreement to be awarded pursuant to the Great Lakes Restoration Initiative Action Plan III. EPA is seeking applications for a project to monitor the temporal trends of persistent, bioaccumulative, and toxic chemicals in fish in the Great Lakes. See details at https://www.epa.gov/great-lakes-funding/great-lakes-fish-monitoring-and-surveillance-program-2020-rfa. About $6M is contemplated for one cooperative agreement over a 5-year period, consisting of incremental funding of about $1.2M per year. Proposed projects MUST be limited to the specified 5-year project duration. The closing date for applications is September 21, 2020. https://www.grants.gov/web/grants/view-opportunity.html?oppId=328285

FY21 ENVIRONMENTAL WORKFORCE DEVELOPMENT AND JOB TRAINING (EWDJT) GRANTS
Environmental Protection Agency Funding Opportunity EPA-OLEM-OBLR-20-03, 2020

U.S. EPA announces the availability of funds and solicits applications from eligible entities, including nonprofit organizations, to deliver Environmental Workforce Development and Job Training programs that recruit, train, and place local, unemployed and under-employed residents with the skills needed to secure full-time employment in the environmental field. See details at https://www.epa.gov/sites/production/files/2020-07/documents/20-03.pdf. About 15 cooperative agreements are anticipated out of total estimated program funding of $3M. The closing date for applications is September 22, 2020. https://www.grants.gov/web/grants/view-opportunity.html?oppId=328343

Cleanup News

BIOREMEDIATION OF GROUNDWATER CONTAMINATED WITH PETROLEUM HYDROCARBONS APPLIED AT A SITE IN BELGRADE (SERBIA)
Bulatovic, S.S., N. Maric, T.S. Knudsen, J. Avdalovic, M.V. Ilic, B. Jovancicevic, et al.
Journal of the Serbian Chemical Society [Published online prior to print]

Enhanced in situ groundwater bioremediation that included biostimulation and bioaugmentation was applied at a hydrocarbon-contaminated site in Belgrade over 12 months. Treatment was highly efficient in reducing concentrations of total petroleum hydrocarbons by 98.55 % in piezometer P-5, 98.3% in piezometer P-6, and 98.09% in piezometer P-7. *A copy of the accepted manuscript is available at* http://www.doiserbia.nb.rs/Article.aspx?ID=0352-51392000003B#.XwYtnihKg2z

ANNUAL PERFORMANCE REPORT 1 JANUARY 2018 - 31 DECEMBER 2018; FIVE YEAR REMEDY PERFORMANCE EVALUATION EAST MULTNOMAH COUNTY, TROUTDALE SANDSTONE AQUIFER REMEDY
Cascade Corporation and The Boeing Company, 189 pp, 2019

This report summarizes performance and monitoring of the joint remedy being implemented to remediate comingled plumes of dissolved volatile organic compounds (VOCs) in the direct vicinity of the Boeing and Cascade properties. The primary remedy for the Troutdale Sandstone Aquifer (TSA) has been a groundwater extraction and treatment system. A soil vapor extraction (SVE) system was later implemented in the mound area where chlorinated VOC concentrations were slow to respond to extraction and treatment. Since 2014, the SVE system has removed 60 lb of VOCs from the unsaturated zone of the TSA. The maximum concentrations of TCE, the predominant contaminant, have decreased by 71% overall at the site. https://www.deq.state.or.us/Webdocs/Controls/Output/PdfHandler.ashx?n=ad3cee24-0f9c-45d5-a358-b92332582a8e&dt&s=EMC%20TSA%202018%20Annual%20Report%2020190531%20Rev.pdf *For access to all site documents,* see https://www.deq.state.or.us/Webdocs/Forms/Output/FPController.ashx?SourceFileType=11&SourceId=1479

LESSONS LEARNED ON VARIOUS IN-SITU AND EX-SITU FOR PFAS GROUNDWATER AND SOURCE TREATMENT TECHNOLOGIES
Gal, J. | Great Lakes Environmental Remediation and Redevelopment Conference, 16-18 October, Lansing, MI, 45 slides, 2019

Slide presentation includes results of a pilot test of biochar injection and soil mixing to treat soil with variable concentrations of PFAS at the Alpena Hide and Leather site, a former tannery. It also includes a case study documenting the pilot test and full-scale implementation of ion exchange using a regenerable resin to treat variable concentrations of PFAS in groundwater at the former Pease Air Force Base. In both cases, the concentrations of PFAS and were significantly reduced. https://www.michigan.gov/documents/egle/egle-fou-GLERRConresentation-PFAS-InsituExsituTreatmentTech-Gal_671433_7.pdf *More information on Alpena Hide and Leather site:* https://www.michigan.gov/pfasresponse/0,9038,7-365-86511_95645-452810--,00.html *More information on Pease Air Force Base PFAS system:* https://www.aaeon.org/_download/content/resources/NUWEA052019-10InstallationStartupOperation.pdf *SERDP Treatment Train Project:* https://www.serdp-estcp.org/Program-Areas/Environmental-Restoration/Contaminated-Groundwater/Emerging-Issues/ER18-1306.

FIFTH FIVE-YEAR REVIEW REPORT FOR TELEDYNE SEMICONDUCTOR/SPECTRA-PHYSICS LASERS, INC. SUPERFUND SITE SANTA CLARA COUNTY, CALIFORNIA ·
EPA Region 9, 71 pp, 2019

Soils and groundwater at the Teledyne Semiconductor and Spectra-Physics Lasers, Inc., properties are contaminated with chlorinated volatile organic contaminants (CVOCs). Groundwater extraction and treatment via air stripping, the original remedy at the Teledyne portion of the site, was ineffective in remediating CVOCs. A 2018 Proposed Plan changed the remedy to enhanced reductive dechlorination (ERD). An ERD treatability study is being conducted that includes soil vapor extraction to mitigate the excess methane produced by ERD. ERD will be followed by monitored natural attenuation (MNA) to confirm that the remediation is occurring within a reasonable time. Monitoring results from the ERD study have successfully demonstrated CVOC dechlorination in shallow and intermediate groundwater zones. The results of an MNA study indicate that the plume size and CVOC concentrations are stable or reducing. The site is progressing toward meeting its remedial action objectives. https://semspub.epa.gov/work/09/100018362.pdf

2018 ANNUAL REPORT TEKTRONIX, INC. - EVALUATION AREA 1 BEAVERTON, OREGON
Tektronix, Inc., 179 pp, 2019

The original remedy for the Tektronix site included in situ thermal treatment of TCE DNAPL source areas within Evaluation Area 1 and monitored natural attenuation (MNA) in areas not indicative of DNAPL, but with TCE concentrations above the risk-based cleanup level. In 2015, the remedy was changed to enhanced in situ bioremediation (EISB) to treat chlorinated volatile organic compound (cVOC) contamination present in the intermediate and deep water-bearing zones under the Building 40 South area of the site. EISB was stimulated by injecting donor substrate mixed with water in three injection events. All 12 monitoring wells in the area showed a reduction in TCE concentration from baseline measurements, two of which saw a 90 and 98% reduction. MNA continues at the site, as indicated by a continued trend of generally decreasing cVOC concentrations, the presence of TCE daughter and end products, and groundwater conditions that are favorable for reductive dechlorination. https://www.deq.state.or.us/Webdocs/Controls/Output/PdfHandler.ashx?p=7f9a94aa-1b41-4e24-aaf3-8c44de6eae1Bpdf&s=TektronixEA1_2018%20Annual%20Report%20(no%20appendices)_080119.pdf

Demonstrations / Feasibility Studies

PHYSICO-CHEMICAL AND AGRONOMIC RESULTS OF SOIL REMEDIATION BY IN SITU CHEMICAL REDUCTION APPLIED TO A CHLORDECONE-CONTAMINATED NITISOL AT PLOT SCALE IN A FRENCH CARIBBEAN BANANA PLANTATION
Mouvet, C., B. Collet, J.-M. Gaude, L. Rangon, S. Bristeau, M. Senergues, et al.
Environmental Science and Pollution Research [Published online 18 January 2020 prior to print]

In situ chemical reduction (ISCR) was tested at pilot-scale in a nitisol at a French Caribbean banana plantation to remediate chlordecone (CLD) using different amendments, including zero-valent iron (ZVI), Daramend®, and a bagasse-ZVI mixture. ZVI outperformed the bagasse-ZVI mixture and Daramend in lowering CLD concentrations. In all the trial plots, dechlorinated transformation products appeared in the soil and soil water as the CLD concentrations decreased and had an overall downward trend over time. Negative agronomic effects of ISCR were observed in radishes, cucumbers, and sweet potato, which could be remedied by simple operational solutions. No negative human health-related effects were observed, as noted by CLD concentrations in radishes, cucumbers, and sweet potato grown with three of the amendments measuring below the maximum residue level.

HYDRAULIC TOMOGRAPHY: 3D HYDRAULIC CONDUCTIVITY, FRACTURE NETWORK, AND CONNECTIVITY IN MUDSTONE
Tiedeman. C.R. and W. Barrash. | Groundwater 58(2):238-257(2020)

Hydraulic tomography (HT) was conducted to estimate the 3-D hydraulic conductivity (K) distribution of a fractured aquifer at high-resolution field scale (HRFS), including the fracture network and connectivity through it. Drawdown data collected from packer-isolated borehole intervals were inverted during 42 pumping tests in a wellfield at the former Naval Air Warfare Center, West Trenton, New Jersey, in the Newark Basin. Five additional tests provided a quality check of HT results. The capabilities of HT demonstrated for 3-D fractured aquifer characterization at HRFS may support improved in situ remediation for contaminant source zones, and applications in mining, repository assessment, or geotechnical engineering. https://www.boisestate.edu/earth-hhrs/files/2020/05/Tiedeman-Barrash-2020-HT-3D-frx-network-GW-58-2-p238-257-compressed.pdf *More information on the former Naval Air Warfare Center, including reports and publications, are available at* https://www.usgs.gov/centers/nj-water/science/contaminant-fate-and-transport-studies-fractured-sedimentary-rock-aquifers?qt-science_center_objects=0#qt-science_center_objects

FRACTURE FLOW CHARACTERIZATION WITH LOW-NOISE SPONTANEOUS POTENTIAL LOGGING
Kowalski, A.C.G., C.A. Mendonca, and U.S. Ofterdinger.
Groundwater [Published online 19 April 2020 prior to print]

Fractures contributing to groundwater flow were identified using spontaneous potential measurements generated by electrokinetic processes when the borehole water head is lowered and then monitored while recovering. The electrokinetic model for flow through a tabular gap was used to interpret the measured data and determine the water head difference that drives the flow through the fracture. Preliminary results are presented from a test site in crystalline rocks on the campus of the University of Sao Paulo.

RAPID REMOVAL OF POLY- AND PERFLUORINATED COMPOUNDS FROM INVESTIGATION DERIVED WASTE (IDW) IN A PILOT-SCALE PLASMA REACTOR
Thagard, S.M. | Emerging Contaminants Summit, 10-11 March, Westminster, CO, 2020

A pilot-scale plasma reactor rapidly and effectively degraded PFAS from liquid investigation derived waste (IDW) obtained from 9 different site investigations at Air Force installations. In the raw water, numerous PFAS were detected in a wide concentration range (~10 to 105 ng/L, total oxidizable precursors (TOP) ~102 to 105 ng/L). Overall, 36-98% of the TOP present in the IDWs were removed. There was no effect of non-PFAS co-contaminants on the degradation efficiency. https://www.contaminantsummit.com/ext/resources/images/Presentations_Snops-Brochure/Selma-Mededovic-Platformpptx.pdf *For more information on the project, see article* https://www.afcec.af.mil/News/Article-Display/Article/2009649/air-force-tests-plasma-reactor-to-degrade-destroy-pfos-pfoa/

FIELD DEMONSTRATION OF THE HORIZONTAL TREATMENT WELL (HRX WELL®) FOR PASSIVE IN-SITU REMEDIATION
Divine, C.E., J. Wright, M. Crimi, J.F. Devlin, M. Lubrecht, J. Wang, J. McDonough, et al.
Groundwater Monitoring & Remediation [Published online 26 July 2020 prior to print]

A full-scale HRX Well was installed and operated to treat groundwater contaminated with TCE using zero-valent iron. Total TCE mass discharge reduction was maintained through the duration of the performance monitoring period and exceeded 99.99%. The actual average capture zone width was estimated to be between 45 and 69 feet. Decreases in TCE concentrations were observed at all four downgradient monitoring wells within the treatment zone (ranging from 50 to 74% at day 436), and the first arrival of treated water was consistent with model predictions.

INNOVATIONS IN ADVANCED OXIDATION TO CONTROL EMERGING CONTAMINANTS IN WASTEWATER EFFLUENT
Linden, K.G. | Emerging Contaminants Summit, 10-11 March, Westminster, CO, 2020

Recent results from bench and pilot-scale studies highlight the emerging possibilities for advanced oxidation process-based control of contaminants in wastewater effluents.
https://www.contaminantssummit.com/ext/resources/images/Presentations_Spons-Brochure/Karl-Linden.pdf

Research

MERCURY POLLUTION AND CLEANUP IN THE SOUTH RIVER, VIRGINIA: UNDERSTANDING THE ROLE OF FATE AND TRANSPORT IN THE DECISION-MAKING PROCESS FOR ENVIRONMENTAL REMEDIATION
Wilcox, D., M. Whitehurst, R. Atwood, P. Bsumek, and B. Wiggins.
Case Studies in the Environment 962226:1-10(2020)

As part of an effort to characterize industrial mercury pollution in the South River in Virginia, movement of mercury through the river ecosystem was studied for six years, and the findings were used to help design remedial projects to reduce mercury exposure to humans and wildlife. The case study can be used to introduce concepts of mercury pollution, fate and transport, and the decisions involved in designing environmental remediation projects. *This article is* ***Open Access*** *at* https://online.ucpress.edu/cse/article/doi/10.1525/cse.2020.962226/110739/Mercury-Pollution-and-Cleanup-in-the-South-River. *For more information on the South River Science Team project, including site documents, see* https://southriversciencteam.org/.

A NATIONAL-SCALE ASSESSMENT OF MERCURY BIOACCUMULATION IN UNITED STATES NATIONAL PARKS USING DRAGONFLY LARVAE AS BIOSENTINELS THROUGH A CITIZEN-SCIENCE FRAMEWORK
Eagles-Smith, C.A., J.J. Willacker, S.J. Nelson, C.M. Flanagan Pritz, D.P. Krabbenhoft, et al.
Environmental Science & Technology 54(14):8779-8790(2020)

Within a citizen-science network, dragonfly larvae were used as biosentinels to assess Hg bioaccumulation in aquatic ecosystems across >450 sites spanning 100 U.S. National Park Service units. The study examined intrinsic and extrinsic factors associated with variation in Hg concentrations. Relationships were used to develop an integrated impairment index of Hg risk to aquatic ecosystems and found that 12% of site-years exceeded high or severe benchmarks of fish, wildlife, or human health risk. https://pubs.acs.org/doi/pdf/10.1021/acs.est.0c01255

REACTIVE GAS PROCESS FOR IN SITU TREATMENT OF 1,2,3- TRICHLOROPROPANE IN VADOSE ZONE SOILS
Hatziger P.B., G. Lavorgna, S.Waisner, and C. Coyle. ESTCP Project ER-201632, 85 pp, 2020

The key objective of this project was to determine whether applying gaseous ammonia to unsaturated soils could effectively increase soil pH and subsequently treat 1,2,3-TCP and other halogenated propanes (HPs) and priority contaminants via alkaline hydrolysis. Microcosm studies showed that soil pH could increase to >10 using ammonia, effectively promoting hydrolysis of TCP and other HPs. However, flow-through columns with site soil indicated it would not be possible to quantify hydrolysis from volatile losses of target contaminants at field-scale due to the flow rate of ammonia required to increase soil pH. As a result, a planned field study was not performed.
https://www.serdp-estcp.org/content/download/51565/502013/file/ER-201632%20Final%20Report.pdf

THE COMPLEX SPATIAL DISTRIBUTION OF TRICHLOROETHENE AND THE PROBABILITY OF NAPL OCCURRENCE IN THE ROCK MATRIX OF A MUDSTONE AQUIFER
Shapiro, A.M., D.J. Goode, T.E. Imbrigiotta, M.M. Lorah, and C. Tiedeman.
Journal of Contaminant Hydrology 223:103478(2019)

Methanol extractions for chloroethene analyses were conducted on rock samples from seven closely spaced coreholes in a mudstone aquifer subjected to releases of TCE NAPL. While proximity to subhorizontal bedding plane fractures dictated TCE concentration in the rock matrix over the length of coreholes, elevated TCE concentrations in the rock matrix were not continuous along the most permeable bedding plane fractures. A complex configuration of subvertical and subhorizontal fractures seemed to be responsible for the TCE distribution from prior TCE releases at land surface. Most TCE was adsorbed to solid surfaces because of the large fraction of organic carbon (*foc*) in the mudstone. Large TCE content in some cores indicated the likely presence of the NAPL form of TCE in the rock matrix. Average values of porosity (*n*) and *foc* in phase partitioning calculations identified several locations of possible NAPL occurrence in the rock matrix and showed variability over several orders of magnitude. Accounting for the variability identified a probability of *PNAPL*, the. The spatial variability of *PNAPL* identified a configuration that may be attributed to a TCE source zone that has evolved after emplacement due to NAPL dissolution, adsorption, and matrix diffusion.

MINERAL REACTION KINETICS CONSTRAIN THE LENGTH SCALE OF ROCK MATRIX DIFFUSION
Wogelius, R.A., A.E. Milodowski, L.P. Field, R. Metcalfe, T. Lowe, A. van Veelen, et al.
Scientific Reports 10:8142(2020)

A study was conducted to define the length scale over which rock matrix diffusion operates within crystalline rock over times relevant to assess radioactive and other long-lived wastes. Detailed chemical and structural analysis of natural specimens sampled at depth from the Toki Granite in Japan implied that, in many cases, the importance of rock matrix diffusion will be minimal. Additional analyses of a contrasting crystalline rock system at the Carnmenellis Granite corroborated results. https://www.nature.com/articles/s41598-020-65113-x

HYDRAULIC RESPONSE TO EMULSIFIED VEGETABLE OIL BIOSTIMULATION: IN-SITU TEST IN A HIGHLY HETEROGENOUS URANIUM CONTAMINATED AQUIFER
Adams, B.G., Master's Thesis, University of Tennessee, Knoxville, 88 pp, 2019

A study was conducted to determine whether emulsified vegetable oil (EVO) injections can reduce hydraulic conductivity and dissolved U in a previously treated U-contaminated aquifer. The study also tested for evidence of a "memory effect," a phenomenon where the second time an electron donor is injected, the environment responds to it faster. A 20% EVO and groundwater mixture was injected within the contaminated aquifer at the FRC Area 2 site at the Y-12 National Security Complex in Oak Ridge, Tennessee. Results show that injecting EVO can have unintended consequences related to hydraulic conductivity that can reduce EVO effectiveness or cause EVO treatment to fail. The effects of EVO interacting with aquifer media and injection well spacing should be carefully considered to minimize changes in preferential flow, limit oxidation of reduced uranium, and maximize the effectiveness of the treatment. Acetate concentrations indicated an accelerated response to EVO compared to the 2009 study results, which served as the only evidence of "memory response."https://trace.tennessee.edu/cgi/viewcontent.cgi?article=6845&context=utk_gradthes

MERCURY SPECIATION AND REMEDIATION STRATEGIES AT A HISTORICALLY ELEMENTAL MERCURY SPILLED SITE
Matsumoto, M. and H. Liu. | Journal of Hazardous Materials 384:121351(2020)

This study quantified Hg speciation in a contaminated area 30 years after an elemental Hg spill and evaluated ex situ and in situ remediation strategies. Soil samples were taken across multiple sites at different soil depths. Most of the total Hg was distributed in surface soils at depths from 0-0.5 m and decreased exponentially with depth. In those surface soils, Hg existed in a potentially highly mobile chemical form suggesting that bioremediation and phytoremediation may be effective remediation techniques. In deep soils below 1 m, Hg predominantly existed in elemental form tightly bound to soil particles. While elemental Hg poses no immediate health risk, in situ thermal treatment may remove the fraction. Size fractionation data suggested that as an ex situ excavation cleanup option, reducing the volume of contaminated soils is possible by only selecting the sand and gravel size fractions of soil for offsite treatment.

CO-BIODEGRADATION STUDIES OF NAPHTHALENE AND PHENANTHRENE USING BACTERIAL CONSORTIUM
Parab, V. and M. Phadke.
Journal of Environmental Science and Health, Part A 55(7):912-924(2020)

Degradation studies of a phenanthrene and naphthalene mixture were conducted using a developed bacterial consortium that included *Chryseobacterium sp.*, *Sphingobacterium sp.*, *Stenotrophomonas sp.*, *Agromyces sp.*, and *Pseudomonas sp*. Results suggested that the pathway used for degradation was the meta-cleavage pathway. Tween 80 used as a surfactant had a maximum effect on the growth of isolates during PAH degradation. In PAH in a laboratory-scale biofilm bioreactor, the bacterial consortium degraded 99.9% of naphthalene and 92.9% of phenanthrene in a 2000 mg/L mixture within six days.

GROUNDWATER CHARACTERIZATION AND MONITORING AT A COMPLEX INDUSTRIAL WASTE SITE USING ELECTRICAL RESISTIVITY IMAGING
Rockhold, M. L., J. L. Robinson, K. Parajuli, X. Song, Z.F. Zhang, and T.C. Johnson.
Hydrogeology Journal [Published online 9 May 2020 prior to print]

Electrical resistivity tomography (ERT) was used to evaluate a contaminated perched aquifer below an industrial waste site in Washington and determine the effectiveness of groundwater extraction for contaminant removal. The perched aquifer, located ~65 m below ground surface and ~10 m above the regional water table, contained high concentrations of nitrate, U, and other contaminants of concern. The study also investigated the effectiveness of using surface electrodes versus surface and horizontal subsurface electrodes for imaging groundwater extraction from the perched water aquifer. Results indicated that using horizontal subsurface electrode arrays could improve the ability of ERT to image deep subsurface features and monitor remediation activities under complex industrial waste sites.https://link.springer.com/content/pdf/10.1007/s10040-020-02167-1.pdf

General News

TREATMENT OF AQUEOUS ARSENIC - A REVIEW OF BIOSORBENT PREPARATION METHODS
Benis, K.Z., A.M. Damuchali, K.N. McPhedran, and J. Soltan.
Journal of Environmental Management 273:111126(2020)

This review includes an overview of 53 recent studies that assess a variety of biomass modification methods, such as activation with acids or bases and biomass-based composites, meant to overcome issues commonly experienced when using untreated biomass. Future perspectives are provided to assist in the further optimization of methods for biomass modifications to enhance As sorption capacities.

SUPERFUND REMEDY REPORT, SIXTEENTH EDITION
U.S. EPA, Office of Land and Emergency Management, EPA-542-R-20-001, July 2020

The 16th edition of the Superfund Remedy Report focuses on Superfund remedial actions selected in fiscal years 2015-2017. The report includes remedies selected in 272 decision documents (Records of Decision [RODs], ROD amendments, and Explanations of Significant Differences with changes to remedy components) signed in the 3-year period. Data are compiled on overall remedy selection and remedies for source materials (soil and sediment), surface water, groundwater, and air (i.e., vapor intrusion). This edition includes a new section summarizing groundwater technical impracticability waivers. https://www.epa.gov/sites/production/files/2020-07/documents/100002509.pdf

RISK COMMUNICATION TOOLKIT
Interstate Technology & Regulatory Council (ITRC), Web-based document RCT-1, 2020

The ITRC Risk Communication Toolkit was developed by the PFAS, 1,4-Dioxane, and Harmful Cyanobacterial Blooms teams to help state personnel, other lead organizations, and stakeholders understand and communicate risk associated with emerging environmental issues and concerns. The toolkit contains an overview of risk communication concepts, steps to develop a risk communication plan and stakeholder outreach activities, guidance for drafting press releases and analytical result summary letters, case studies, and a risk communication plan template, and additional tools and case studies added and updated by ITRC teams as they are developed. https://rct-1.itrcweb.org/ *Also see YouTube video on risk communication created as part of the PFAS team training videos:* https://www.youtube.com/watch?v=HqOaPip-z5g&feature=youtu.be.

PFAS FATE, TRANSPORT AND TREATMENT
Abriola, L.M. and T.K. Strathmann. SERDP & ESTCP Webinar Series, Webinar #116, July 2020

On July 23, SERDP and ESTCP sponsored a webinar to discuss approaches to better characterize PFAS fate and transport in the subsurface, as well as a novel technology for PFAS destruction. Specifically, investigators present results of experiments, mathematical modeling, and decision tool development to further understand PFAS fate and transport in the subsurface as well as a novel technology to treat PFAS in water and other high moisture content wastes.
https://www.serdp-estcp.org/Tools-and-Training/Webinar-Series/07-23-2020

ASSESSING THE ECOLOGICAL RISKS OF PER-AND POLYFLUOROALKYL SUBSTANCES (PFAS) AT AQUEOUS FILM FORMING FOAM SITES WORKSHOP
Conder, J., J. Arblaster, and K. Bridges, SERDP & ESTCP Workshop, 9 March, Westminster, CO, 2020

The 3-hour, 5-chapter workshop provided an overview of ecological risk assessments for PFAS, including a state-of-the-science overview of the fate, exposure, and toxicity of PFAS in ecosystems. Presentations focused on the recently-released guidance document, "Guidance for Assessing the Ecological Risks of PFAS to Threatened and Endangered Species at Aqueous Film Forming Foam Impacted Sites" (https://www.serdp-estcp.org/Program-Areas/Environmental-Restoration/ER18-1614). The workshop also provided a hands-on demonstration of the customizable ERA Model Tool that enables ecological risk assessors to enter site-specific data, such as concentrations of PFAS in sediment, water, soil, and/or biota, along with typical exposure factors for site-relevant wildlife species of interest and available toxicological information for common PFAS. *See a video recording of all presentations on YouTube* https://www.youtube.com/watch?v=es89v51sCsk&list=PLMbD5M1y4EtnDs0Y2RNBsjurIeplv-Qb9

INSIDE: AN EFFICIENT GUIDE FOR SUSTAINABLE REMEDIATION PRACTICE IN ADDRESSING CONTAMINATED SOIL AND GROUNDWATER
Naseri-Rad, M., R. Berndtsson, K.M. Persson, an K. Nakagawa.
Science of The Total Environment 740:139879(2020)

The INfluence based deciSIon guiDE (INSIDE) is a methodology that considers realistic interactions among eight criteria to provide a one-time best option for choosing a remediation method for the project at hand and a management plan for further improvements of the system. INSIDE recognizes economic, environmental, social, and technological considerations for the most sustainable practice. The method was applied to a data-scarce case study in Iran to prioritize between remediation methods for a contaminated groundwater aquifer. The case study shows that human health risk and environmental impacts are more influential than other evaluated criteria.
https://reader.elsevier.com/reader/sd/pii/S0048969720333994?token=BFCDB59BDE090B88EF4EAF4C404529DD7E1DFF1E31EFC4BEF8879E2FA8608F010E57B9DA7EB9937C51182590320B4FFE

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