Technology Innovation News Survey

Entries for March 16-31, 2019

Market/Commercialization Information

AE SERVICES TO SUPPORT THE USACE SOUTH ATLANTIC DIVISION, MOBILE DISTRICT ENVIRONMENTAL RESTORATION PROGRAM

U.S. Army Corps of Engineers, USACE District Mobile, AL.
Federal Business Opportunities, Solicitation W9127818R0094, 2019

This notice constitutes a request for submittal of SF330 qualifications. The Government intends to award up to six contracts: three or more unrestricted awards and three or more small business awards, NAICS code 541330. The total capacity of all awards will be $49M over a 3-year term: $45M unrestricted shared capacity and $4M small business set-aside shared capacity. Work under this contract will be subject to satisfactory negotiation of individual firm-fixed-price task orders. Rates will be negotiated for each 12-month period of the contract. Contractors will provide all products and services associated with complex hazardous, toxic, and radioactive waste (HTRW) projects, including strategy development, plans, data gathering, analysis, investigations, evaluations, studies, designs, remedial design, and regulatory support. SF330 packages are due by noon CT on May 15, 2019.
https://www.fbo.gov/spg/USA/COE/DACA01/W9127818R0094/listing.html

NAVAJO NATION COVE MESA II EROSION CONTROL AND REMOVAL ACTION

U.S. Environmental Protection Agency, Region IX, San Francisco, CA.
Federal Business Opportunities, Solicitation 68HE0919R0003, 2019

This solicitation is a woman-owned small business set-aside, NAICS code 562910 (size standard 750 employees), for erosion control and repair at the Mesa II Mine Site located in the Cove Chapter of the Navajo Nation, Apache County, AZ. The scope of work includes activities for erosion control/repair and excavation/consolidation of radiological contaminated soils associated with the Mesa II Mine site. Go to FedConnect for all background documentation, updates, and communication at https://www.fedconnect.net/FedConnect/?doc=68HE0919R0003&agency=EPA. The anticipated magnitude of the firm-fixed-price contract is between $1M and $5M for a period of performance of 105 days. Proposals are due by 3:30 PM PT on May 31, 2019.
https://www.fbo.gov/spg/EPA/OAM/RegIX/68HE0919R0003/listing.html

MULTI-SITE STUDY OF THE HEALTH IMPLICATIONS OF EXPOSURE TO PFAS-CONTAMINATED DRINKING WATER

Department of Health and Human Services, Agency for Toxic Substances and Disease Registry (ATSDR), Funding Opportunity RFA-TS-19-002, 2019

ATSDR is soliciting research to commence a multi-site study on the human health effects of exposures to drinking water contaminated with per- and polyfluoroalkyl substances (PFASs). Proposed study sites must include communities using PFAS-contaminated private residential wells or public water systems. Exposure assessment will be based on measured PFAS serum levels as well as estimated serum levels derived from pharmacokinetic modeling of reconstructed PFAS drinking water concentrations over time. Grant awardees will conduct historical reconstruction/water modeling to determine PFAS concentration and evaluate effect biomarkers such as lipids and tests of immune and thyroid function derived from pharmacokinetic modeling of reconstructed PFAS drinking water concentrations over time. ATSDR intends this research to be a 2-part program consisting of (1) a mandatory core research protocol to allow ATSDR to aggregate the core data and compare lab and statistical analyses across sites, and (2) options to propose additional investigator-initiated research questions and hypotheses related to the overall goals of this funding opportunity. The closing date for applications is May 30, 2019. Up to 6 awards from estimated total program funding of $32.5M is anticipated: Award Ceiling $3M, Award Floor $500,000.
https://www.grants.gov/web/grants/view-opportunity.html?oppId=314434

FY20 ENVIRONMENTAL WORKFORCE DEVELOPMENT & JOB TRAINING GRANTS

U.S. Environmental Protection Agency, Funding Opportunity EPA-OLEM-OBLR-19-01, 2019

EPA is soliciting proposals from eligible entities to deliver Environmental Workforce Development and Job Training (EWDJT) programs that recruit, train, and place local, under-employed and unemployed residents with the skills needed to secure full-time employment in the environmental field. EWDJT Grants require training in brownfield assessment and/or cleanup activities and also require that HAZWOPER training be provided to all individuals enrolled. EPA encourages applicants to develop curricula based on local labor market assessments and employers' hiring needs while delivering comprehensive training that results in graduates securing multiple certifications. EPA anticipates up to 20 awards from an estimated total program funding of $4M, Award Ceiling: $200,000. The deadline for proposals is 11:59 PM ET on June 10, 2019. https://www.grants.gov/web/grants/view-opportunity.html?oppId=314901

2019 ERDC BROAD AGENCY ANNOUNCEMENT

U.S. Army, Engineer Research and Development Center, Opportunity W912HZ-19-BAA-01, 2019

The U.S. Army ERDC has issued a BAA for various research and development topic areas. Research areas of environmental interest under this BAA include (1) improved detection and discrimination of depleted uranium munitions and unexploded ordnance; (2) environmental sensing, characterization, and monitoring capabilities necessary to quantify environmental site conditions and trends, particularly remote sensing; (3) innovations in environmental instrumentation; and (4) innovative technologies for treating hazardous waste and contaminated surface and ground waters. Closing date for applications is January 31, 2020.
https://www.grants.gov/web/grants/view-opportunity.html?oppId=312615

REMEDIAL ACTION PLAN AT THE GAINESVILLE JOB CORPS CENTER

U.S. Department of Labor, Employment Training Administration, Washington, DC.
Federal Business Opportunities, Solicitation 1630DC-19-Q-00028, 2019

The Department of Labor seeks the services of a qualified service-disabled veteran-owned small business to perform soil remediation services at the Gainesville Job Corps Center's facilities. NAICS code 562910 applies, size standard $20.5M and/or 750 employees. The magnitude of this procurement is between $100,000 and $250,000. Execution of the Florida Department of Environmental Protection (FDEP) Remedial Action Plan includes site demolition, placement of clean soil, soils compaction, site restoration, and notifications and reporting to the FDEP. The work involves construction services to address the impacts of metals, PCBs, and PAHs that exceed FDEP Soil Cleanup Target Levels. Oversight of the work and reporting will be provided by a Florida Licensed Professional Engineer. Offers are due by 2:00 PM ET on June 5, 2019. https://www.fbo.gov/spg/DOL/ETA/OJC/1630DC-19-Q-00028/listing.html

Cleanup News

ELECTRICAL RESISTANCE HEATING: WHEN MOTHER NATURE BRINGS CHALLENGES

Avritt, S.
The 27th Annual David. S. Snipes/Clemson Hydrogeology Symposium, 4 April, Clemson University, Clemson, SC. Abstract book, p 3, 2019

Former manufacturing operations at the CTS of Asheville Inc. Superfund site released chlorinated VOCs (mainly TCE) and fuel oil to the site's soil and groundwater. Direct sensing investigation techniques delineated an area of about 1.2 acres containing LNAPL comingled with TCE. In 2014, a vapor intrusion (VI) assessment conducted at residential properties east of the site indicated TCE concentrations in indoor air above EPA's applicable levels. An Interim Remedial Action Consent Decree entered in March 2017 indicated a remedial action objective of 95% removal of TCE from saturated soil and groundwater, and LNAPL in the source area. An electrical resistance heating (ERH) system was designed to remediate the subsurface from the water table to bedrock (an estimated 47,250 yd^3). ERH remediation was successfully implemented from June to November 2018. *See news on cleanup progress at* https://www.epa.gov/newsreleases/first-phase-interim-cleanup-completed-cts-superfund-site-asheville-nc *and additional information on the project website at* https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0402598.

CASE STUDY: COMPLETE VAPOUR INTRUSION MITIGATION SERVICES FOR AN INDUSTRIAL PLANT

Hurst, P.
2019 SMART Remediation, 7 February, Ottawa, Canada. 16 slides, 2019

A plastics manufacturing plant with documented indoor air concentrations of TCE above the state's response levels required a multi-pronged approach to mitigate both indoor air and sub-slab sources of TCE. Following data review to understand TCE sources and building conditions, an assessment of contamination sources and transport pathways was completed through a combination of multiple rounds of grid-based indoor air and sub-slab vapor testing of TCE and other chlorinated solvents, the use of an on-site portable lab that provided low-level air concentration data at a high resolution, video surveys of utilities, continuous differential pressure monitoring to assess gradients that could affect contaminant mobility, and flux chamber testing to assess potential indoor air TCE sources. Air conveyance testing was conducted to support design of a sub-slab depressurization system. Interim mitigation included the provision of climate-controlled fresh air to increase the effective air exchanges rates and reduce TCE concentrations. Understanding how indoor air TCE concentrations responded to increased air exchanges informed needed modifications to the building HVAC system as part of the overall VI mitigation program.
https://2ziapbmm3zh1x23mj335vjxt-wpengine.netdna-ssl.com/wp-content/uploads/2018/02/SMART-Remediation-Ottawa-2019-Paul-Hurst.pdf

SWITCHING IT UP: FROM LONG TERM PUMP-AND-TREAT TO INSITU CHEMICAL OXIDATION FOR 1,4-DIOXANE IN GROUNDWATER REMEDIATION (2019 UPDATE)
Walsom, G.
SMART Remediation: March 19, 2019, Calgary, AB, Canada. 12 slides, 2019

After 15+ years of hydraulic containment and pump-and-treat using an advanced photo-catalytic oxidation system, re-evaluation of available technologies for remediation of a 1,4-dioxane plume was conducted for a historical industrial site in southwestern Ontario. The move from pump and treat to an active chemical oxidation process was supported by the emergence of new technologies and products for active 1,4-dioxane treatment. At least one oxidant, persulfate, has been developed and proven effective for in situ chemical oxidation of 1,4-dioxane. This presentation illustrates the history of the issue and decisions made in 2002, along with a new technology evaluation and selection process implemented in 2018. A cost analysis of the project for the past 20 years and predictions of remediation closure are included.
https://2ziapbmm3zh1x23mj335vjxt-wpengine.netdna-ssl.com/wp-content/uploads/2018/12/SMART-Remediation-Calgary-2019-Grant-Walsom.pdf

CLEANUP COMPLETE AT CLEBURN STREET WELL SUPERFUND SITE IN GRAND ISLAND, NEBRASKA
U.S. Environmental Protection Agency News Release, 5 Apr 2019

U.S. EPA Region 7 announced that it has completed the Remedial Action phase for Operable Unit 2 at the Cleburn Street Well Superfund Site in Grand Island, Nebraska. EPA used a thermal treatment system at the site to address soil and groundwater contaminated with TCE, PCE, and petroleum hydrocarbons. Heating mobilized the contaminants, which were collected through an extraction system for safe disposal. Post-cleanup sampling of soil and groundwater confirmed that thermal treatment removed >99% of the contaminants in just six months. Thermal treatment of contamination at the site allowed EPA to address the source area without the need for extensive excavation, which would have resulted in long-term disruption of traffic on a popular road. Additional benefits of thermal treatment included greater energy efficiency, lower long-term cost, and the ability to address NAPL at the site.
https://www.epa.gov/newsreleases/cleanup-complete-cleburn-street-well-superfund-site-grand-island-nebraska *See more about the technologies used in the cleanup of this site in the Fourth Five-Year Review report (2018) at* https://semspub.epa.gov/src/document/07/30353277.

2017 ANNUAL GROUNDWATER REPORT: JAMES F. BELL #1E
New Mexico Energy, Minerals and Natural Resources, Santa Fe, NM. 190 pp, 2018

Environmental remediation activities at the James F. Bell #1E site for the El Paso Natural Gas Company are being managed pursuant to the procedures set forth in the remediation plan for groundwater encountered during pit closure activities. The site is located on federal land. Free product is present at the site, and recovery has been performed periodically since 1997. Mobile dual-phase extraction (MDPE) events were completed on July 11 through 14, 2017, to enhance free-product recovery from monitoring wells MW-1 and MW-8. The MDPE process combines SVE with groundwater depression to enhance the removal of liquid and vapor-phase hydrocarbons. A submersible pump simultaneously removes groundwater, inducing a hydraulic gradient toward the extraction well and creating groundwater depression to expose the hydrocarbon smear zone to SVE. Recovered liquids were disposed of off-site. Recovered vapors were used as fuel to power the vacuum and burned in the MDPE internal combustion engine, resulting in few to no emissions. Two 72-hour MDPE events were completed, recovering ~82.3 gal of hydrocarbons from MW-1 and ~40.1 gal of hydrocarbons from MW-8. Appendix E contains the report summarizing the MDPE events. Recovery of measurable free product will continue by completion of one or more MDPE events in 2018. Additional SVE feasibility testing via installation of another SVE well is also planned.
http://ocdimage.emnrd.state.nm.us/imaging/filestore/SantaFeEnvironmental/AO/20180405/pENV00003RP196_04_05_2018_12_47_41.pdf

Demonstrations / Feasibility Studies

ANALYSIS OF LONG-TERM PERFORMANCE OF ZERO-VALENT IRON APPLICATIONS
Popovic, J., L. Cook, D Williamson, and R. Wilkin.
ESTCP Project ER-201589, 524 pp, 2018

The long-term performance of zero-valent iron (ZVI) is detailed in this report both as a source-zone treatment and as a barrier treatment for chlorinated VOCs. The project approach consisted of both desktop review and field assessment. The field assessment was conducted at two sites: (1) a ZVI permeable reactive barrier for dissolved-phase TCE/DCE plume control assessment at Allegany Ballistics Laboratory Site 5, and (2) ZVI introduction by soil mixing in a PCE/TCE/DCE source area at the St. Louis Ordnance Plant OU1. https://www.serdp-estcp.org/content/download/48429/460763/file/ER-201589%20Final%20Report.pdf *See also the Executive Summary at* https://www.serdp-estcp.org/content/download/48950/466772/file/ER-201589%20Executive%20Summary.pdf.

FIRST FIVE-YEAR REVIEW REPORT FOR BRESLUBE-PENN, INC. SUPERFUND SITE ALLEGHENY COUNTY, PENNSYLVANIA
U.S. EPA Region 3, Philadelphia, PA. 69 pp, 2019

The site encompasses the former Breslube-Penn facility, a level 7-acre tract of land used by different entities for used oil processing and reclamation (1977-1986) and then as a used oil transfer station (1987-1992). The site soil is contaminated with metals, VOCs, and PCBs, and the groundwater is affected by a wide range of chlorinated and non-chlorinated VOCs and metals. For OU1, extensive excavation and removal of contaminated soils and installation of the groundwater pump-and-treat system, slurry wall, and cap was completed by 2015, along with removal of the existing wetlands on the Waste Management Area (WMA) and construction of compensatory wetlands. Groundwater and LNAPL collected by French drains flow into concrete cells for treatment using activated carbon, and then are discharged into underground infiltration galleries outside the WMA. For OU2 (groundwater outside the WMA), the remedial design phase is underway. In September and October 2015, PRP contractors conducted the first in situ groundwater treatment injections as part of an extended pilot study to confirm the effectiveness of in situ treatment. For the shallow unconsolidated aquifer, in situ enhanced biodegradation was conducted by injecting emulsified vegetable oil (to serve as a carbon source for microbes) and nutrients into wells along the southeastern border of the WMA. Additional nutrient injections were conducted on a quarterly basis through the fall of 2017 as needed based on nutrient monitoring data. Additional emulsified vegetable oil and nutrients were injected in April 2018. For the shallow bedrock aquifer, in situ chemical oxidation (ISCO) was conducted from 2015 through 2017 by injecting sodium hydroxide and sodium persulfate into wells outside the WMA along its southeastern and northern borders. When the 2-year pilot study data indicated that ISCO had been effective in reducing VOC concentrations and that biodegradation of VOCs was occurring in areas not affected by the oxidant, contractors conducted additional bioremediation injections in April 2018 into the shallow bedrock aquifer. Upon completion of this pilot study, an enhanced bioattenuation plan will be submitted to EPA for approval. https://semspub.epa.gov/src/document/03/2275291

Research

DEMONSTRATION OF SMOLDERING COMBUSTION TREATMENT OF PFAS-IMPACTED INVESTIGATION-DERIVED WASTE
Major, D.W.
SERDP Project ER18-1593, 40 pp, 2019

A surrogate fuel was evaluated to support a smoldering process that achieves temperatures (> 900°C) sufficient to destroy per- and polyfluoroalkyl substances (PFASs). The bench-scale study was conducted in two phases. Phase I evaluated if granular activated carbon and ground rubber could smolder at required temperatures when mixed with sand. Phase II examined the extent and repeatability of remediation of the solid matrix by smoldering combustion (SC) by measuring (1) PFAS concentration in soil before and PFAS concentration in soil/ash after treatment; (2) PFAS in emissions; (3) and hydrofluoric acid concentrations as a measure of total PFAS mineralization. All testing was performed in reactors specifically designed for testing SC.
https://www.serdp-estcp.org/Program-Areas/Environmental-Restoration/ER18-1593

INTEGRATING TOOLS FOR NON-TARGETED ANALYSIS RESEARCH AND CHEMICAL SAFETY EVALUATIONS AT THE U.S. EPA
Sobus, J.R., J.F. Wambaugh, K.K. Isaacs, A.J. Williams, A.D. McEachran, A.M. Richard, et al.
Journal of Exposure Science & Environmental Epidemiology 28(5):411-426(2018)

New tools have been developed to enable rapid assessment of potentially harmful chemical exposures and their attendant biological responses. One group of tools—"non-targeted analysis" (NTA) methods—allows the rapid characterization of thousands of never-before-studied compounds in a wide variety of environmental, residential, and biological media. This article discusses current applications of NTA methods, challenges to their effective use in chemical screening studies, and ways in which shared resources (e.g., chemical standards, databases, model predictions, and media measurements) can advance their use in risk-based chemical prioritization. Resources and projects within EPA's Office of Research and Development (ORD) provide and receive benefits relevant to NTA research endeavors, including EPA's Non-Targeted Analysis Collaborative Trial and a research framework that shows how NTA methods will bridge chemical prioritization efforts within ORD. The framework exists as a guide for institutions seeking to understand the complexity of chemical exposures and the impact of the exposures on living systems. https://www.nature.com/articles/s41370-017-0012-y

LESSONS LEARNED: NATURAL AND ENHANCED ATTENUATION OF EXPLOSIVES ON AN ACTIVE GRENADE RANGE
Borden, R.C., D. Knappe, J. Won, and B. Yuncu.
ESTCP Project ER-201123, 94 pp, 2018

Explosives residues can accumulate from low-order detonations. In this project, the transport and attenuation of TNT and RDX were evaluated in variably

saturated soils at an active hand grenade range. The project encompassed a series of lab experiments and a 27-month field study conducted in adjoining grenade-throwing bays, with the focus on monitored natural attenuation in one and enhanced attenuation in the other. TNT was extensively degraded in all lab studies and never accumulated in the field. RDX did not biodegrade in well-mixed batch microcosm studies but did degrade in lab columns and in the field under mixed aerobic/anaerobic conditions. Soil redox conditions were sensitive to soil moisture and organic carbon. Addition of glycerin and lignosulfonate enhanced RDX biodegradation and reduced RDX leaching.
https://www.serdp-estcp.org/content/download/49024/467426/file/ER-201123%20Lessons%20Learned.pdf

REMEDIATION OF CLAY SOILS CONTAMINATED WITH POTENTIALLY TOXIC ELEMENTS: THE SANTO AMARO LEAD SMELTER, BRAZIL, CASE

de Andrade-Lima, L.R.P., L.A. Bernardez, M.G. dos Santos, and R.C. Souza.
Soil and Sediment Contamination 27(7):573-591(2018)

The clay soil from the region of the former Santo Amaro primary lead smelter has high concentrations of potentially toxic elements, especially Pb, Cd, Sb, and Zn. This study presents a preliminary evaluation of remediation by soil washing and thermal stabilization to support cleanup initiatives for this site. Treatment results indicate that soil washing using EDTA could be an effective method to clean up the soil, although the solid-liquid separation step by filtration is slow. Soil thermal treatment at temperatures higher than 800°C in an oxidant atmosphere resulted in the formation of ceramic structures because of the high smectite content, which stabilized the potentially toxic elements. The estimated cost for remediation by soil excavation, replacement, and stabilization of the highly contaminated site at the Santo Amaro region is estimated at $20-$30M US.

RECENT DEVELOPMENTS AND PROSPECTS OF DIOXINS AND FURANS REMEDIATION

Rathna, R., S. Varjani, and E. Nakkeeran.
Journal of Environmental Management 223:797-806(2018)

Incineration and incomplete combustion of solid waste are the main source for discharge of dioxins and furans to the environment, although chemical processes that occur during the manufacture of herbicides and pesticides, use of fertilizers, and bleaching of paper and wood pulp may also contribute. This review describes the sources of dioxins and furans pollution, hazardous effects on the ecosystem, and recent techniques to minimize and treat dioxins and furans contaminants in the environment. The significance of conventional and innovative remediation techniques prevailing around the globe for treating dioxins and furans is also discussed.

KINETICS OF PHYTOREMEDIATION OF PETROLEUM HYDROCARBON CONTAMINATED SOIL

Murray, E.W., B.M. Greenberg, K. Cryer, B. Poltorak, J. McKeown, J. Spies, and P.D. Gerwing.
International Journal of Phytoremediation 21(1):27-33(2019)

PEPSystems™—plant growth-promoting rhizobacteria-enhanced phytoremediation systems—have been deployed across Canada for the treatment of soil contaminated with petroleum hydrocarbons (PHCs), including CCME fractions F2 and F3. In previous field trials of PEPSystems, PHCs were mostly degraded by microbes in the rhizosphere. Using new data collected from multiple commercial PEPSystems remediation sites across Western Canada, the kinetic equations of PHC decay were tested to determine if remediation time was accurately predicted. In general, when compared to the predicted time to remediation endpoint, data from recent commercial field applications showed that 35% and 20% less time was needed to reach remediation endpoints for fractions F2 and F3, respectively. As a result, the predictive kinetic equation for fraction F2 degradation was updated to reflect current remediation outcomes. Insufficient data were available to update the F3 equation. https://www.tandfonline.com/eprint/ayfpccwFKUi9qYPp5AgC/full?target=10.1080/15226514.2018.1523870. *See slides for more:* https://2ziapbmm3zh1x23mj335vjxt-wpengine.netdna-ssl.com/wp-content/uploads/2018/12/SMART-Remediation-Edmonton-2019-Ben-Poltorak.pdf.

FACILITATED TRANSPORT ENABLED IN SITU CHEMICAL OXIDATION OF 1,4-DIOXANE-CONTAMINATED GROUNDWATER

Carroll, K.C., M.L. Brusseau, T.B. Boving, and R. Ball.
SERDP Project ER-2302, 219 pp, 2018

Work was conducted to enhance the solubility, stability, activation, and transportability of strong oxidants (e.g., ozone or O_3) to facilitate in situ chemical oxidation (ISCO) for remediating 1,4-dioxane under lab conditions. This goal was achieved through the co-injection of oxidants with chemical agents that facilitate oxidant transport. O_3 formed an inclusion complex or partitioned into the delivery agent cyclodextrin, which increased the amount of oxidant delivered. Facilitated transport increased specificity of oxidation for 1,4-dioxane and co-contaminant chlorinated solvents as they also partitioned into the cyclodextrin. Additional methods for stabilizing and activating oxidants were developed by injecting mixtures of oxidants, such as persulfate, and using in situ aquifer materials and solid forms of iron (siderite, iron filings) to support delayed activation of injected oxidants to allow transport of ISCO reagents into contaminated groundwater systems. https://www.serdp-estcp.org/content/download/48532/461633/file/ER-2302%20Final%20Report.pdf

DEVELOPMENT OF FIELD METHODOLOGY TO RAPIDLY DETECT *DEHALOCOCCOIDES* AND *DEHALOBACTER* SPP. GENES ON-SITE

Cupples, A.M., S.A. Hashsham, R.D. Stedtfeld, and P.B. Hatzinger.
SERDP Project ER-2309, 223 pp, 2019

Loop-mediated isothermal amplification (LAMP) is a novel molecular method recently developed for the specific detection of nucleic acids. LAMP is a one-step amplification reaction that amplifies a target DNA sequence using four to six primers. The *Bst* large-fragment DNA polymerase has strand displacement activity and helicase-like activity that allow it to unwind and amplify DNA strands in the 60-65°C temperature range. Because LAMP is rapid, sensitive, and specific and occurs isothermally, it has emerged as an alternative to real-time quantitative PCR-based methods in a wide variety of applications. Further, because LAMP does not require a real-time thermal cycler (amplification is isothermal), the method allows less expensive and potentially field-deployable detection devices to be used. https://www.serdp-estcp.org/content/download/48829/465375/file/ER-2309%20Final%20Report.pdf *See also the Executive Summary at* https://www.serdp-estcp.org/content/download/49113/468390/file/ER-2309%20Executive%20Summary.pdf.

ROLE OF ZERO VALENT IRON AND ORGANIC SUBSTRATES IN CHLORINATED SOLVENT DEGRADATION: AN EX SITU REMEDIATION CASE STUDY

Stevenson, Alexander, Master's thesis, University of Western Ontario. 84 pp, 2018

Field practice suggests that a combination of biotic and abiotic technologies to treat soil affected by chlorinated solvents positively influences a remediation project's success rate. Using ex situ mixing techniques, two previous remediation programs employed a material containing both zero-valent iron (ZVI) and a dry organic substrate to reduce contaminants abiotically and increase anaerobic bioremediation in soil contaminated with PCE and 1,2-DCE. Subsequent research assessed the contributions made by the dry organic substrate and ZVI to the observed changes in chlorinated solvent concentrations by analyzing field samples collected from the previously remediated sites as well as by conducting bench-scale batch reactor experiments designed to test the individual contributions of ZVI and the organic substrate to dechlorination processes. Lab results suggest the mixture of ZVI and organic substrate does not lead to the concentration decreases observed in the full-scale remediation projects, and that volatilization may be the most prominent contributing process for contaminant removal from soil. Field samples analyzed for microorganisms showed a community shift in the area remediated as well as a decrease in *Dehalococcoides* population size, thus indicating that soil mixing can be detrimental to microbial dechlorination activity. https://ir.lib.uwo.ca/etd/5382/

ROBUST REMOTE SENSING OF TRACE-LEVEL HEAVY-METAL CONTAMINANTS IN WATER USING LASER FILAMENTS

Li, H., H. Zang, H. Xu, H.-B. Sun, A. Baltuska, and P. Polynkin.
Global Challenges 3(1):1800070(2019)

Analytical chemistry-based techniques generally are not suitable for rapid monitoring of water bodies because they involve collection of water samples and off-site lab analysis. Laser-based approaches such as laser-induced breakdown spectroscopy (LIBS) might offer a powerful alternative, yet conventional LIBS relies on the use of tightly focused laser beams, requiring a stable air-water interface in a controlled environment. This paper reports a proof-of-principle, quantitative, simultaneous measurement of several representative heavy-metal contaminants in water at ppm-level concentrations, using ultra-intense femtosecond laser pulses propagating in air in the filamentation regime. This approach is straightforwardly extendable to kilometer-scale standoff distances under adverse atmospheric conditions and is insensitive to movements of the water surface due to the topography and water waves.
https://onlinelibrary.wiley.com/doi/10.1002/gch2.201800070

REMEDIATION OF HEAVY-METAL-CONTAMINATED SEDIMENTS IN USA USING ULTRASOUND AND OZONE NANOBUBBLES

Batagoda, J.H., S.D.A Hewage, and J.N. Meegoda.
Journal of Environmental Engineering and Science [Published online 29 Jan 2019 prior to print]

The lower 12.875 km of the Passaic River is heavily contaminated due to industrial activities, such as heavy metal extraction from chromium-ore-processing plants and production of pesticides and herbicides. Conventional methods for remediating contaminated sediments have limited application due to the tidal action and urban area of the contaminated section of the river. Bench-scale tests were performed to evaluate the feasibility of in situ treatment using ultrasound and ozone nanobubbles to remediate the sediments. Ozone nanobubbles increased the solubility of ozone in water and reduced wastage. Cr oxidation increased as ozone concentrations increased in water. A synthetic soil with a grain size distribution similar to that of actual river sediments was artificially contaminated with Cr and used in this research. Test results showed a 97.54% Cr removal efficiency, suggesting the feasibility of the proposed technology for pilot-scale studies. *See an information brief at* https://par.nsf.gov/servlets/purl/10026402

General News

EPA ASKS FOR PUBLIC INPUT ON DRAFT INTERIM RECOMMENDATIONS FOR ADDRESSING GROUNDWATER CONTAMINATED WITH PFOA AND PFOS

U.S. Environmental Protection Agency News Release, 25 Apr 2019

U.S. EPA has released draft interim guidance for addressing groundwater contaminated with PFOA and/or PFOS for public review and comment. This action is a key component of the Agency's PFAS Action Plan. The interim guidance will support actions to protect the health of communities impacted by groundwater that contains PFOA and PFOS above the 70 ppt level and is a potential source of drinking water. The recommendations may be revised as new information becomes available. EPA has opened a docket for a 45-day public comment period. The draft guidance describes EPA's interim recommendations for screening levels and preliminary remediation goals to inform final cleanup levels for PFOA and/or PFOS contamination of groundwater that is currently or potentially a source of drinking water. To view the draft guidance and to learn how to submit comments, visit https://www.epa.gov/pfas.

WORKSHOP ON MANAGEMENT OF DOD'S CHLORINATED SOLVENTS IN GROUNDWATER SITES

Strategic Environmental Research and Development Program (SERDP) and Environmental Security Technology Certification Program (ESTCP). 44 pp, 2018

SERDP and ESTCP co-sponsored a workshop to (1) review the current state of the science regarding chlorinated solvent contamination in groundwater; (2) evaluate whether currently available characterization, remediation, and monitoring technologies meet users' needs and requirements; and (3) identify and prioritize remaining research opportunities. About 55 invited personnel representing DoD remedial project managers, federal and state regulators, engineers, researchers, industry representatives, and consultants were in attendance. This document presents a review of the research, demonstration, and identified technology transfer needs. https://www.serdp-estcp.org/content/download/47975/456978/file/Chlorinated%20Solvents%20Workshop%20Report%202018.pdf

STATE COST SHARE PAYMENT OPTIONS

U.S. Environmental Protection Agency, 3 pp, 2018

CERCLA and the NCP require states to share the costs of fund-financed remedial actions incurred at sites listed on the National Priorities List. A state's cost share can be paid in cash, credit, or in-kind services. This fact sheet explains state options for providing cost share as provided in 40 CFR Part 35, Subpart O, "Cooperative Agreements and Superfund State Contracts for Superfund Response Actions." 40 CFR §35.6105(b)(2)(i) states that where a facility is not operated by the state (or political subdivision), the state must pay 10% of the cost of the remedial action, and then section ii provides that where a state (or political subdivision) operates a facility either directly or through a contractual relationship at the time of disposal, the state must pay 50% (or greater as EPA may determine as appropriate) of the cost of removal, remedial planning, and remedial action. https://semspub.epa.gov/src/document/11/100001811

GUIDANCE FOR MANAGEMENT OF SUPERFUND REMEDIES IN POST CONSTRUCTION

U.S. EPA, Office of Superfund Remediation and Technology Innovation, OLEM 9200.3-105, 61 pp, 2017

This document provides comprehensive guidance for managing Superfund remedial actions (RAs) where construction activities are complete (i.e., post-construction completion or PCC). The guidance emphasizes the importance of early planning and consistent communication to set the stage for successful PCC activities and to ensure that remedies continue to be protective of human health and the environment. Recommendations for Superfund remedies are provided regardless of how the RA is funded. The primary audience for this guide is the EPA remedial project manager.
http://semspub.epa.gov/src/document/11/196829

A DIY GROUNDWATER MODEL

Zych, A., R. Hollister, and X. Garcia.
Science Friday, 21 Dec 2018

In many places, water for municipal and household use comes from underground aquifers. If the groundwater in such a place became contaminated, the consequences could easily affect entire cities or more. How does something like this happen? This classroom lab resource offered by Science Friday opens with a 10-minute video explaining one example of this very situation, which occurred in 2015 at the Gold King Mine in Colorado, and the efforts to mitigate it. The lesson provides an introduction to groundwater hydrology with helpful diagrams and a downloadable worksheet to check students' understanding. This resource offers detailed instructions for building reusable groundwater demonstration models from easily obtained materials as well as accompanying instructions for using the models to simulate the contamination of an aquifer. This standards-aligned, hands-on activity was written with high school students in mind and is estimated to take two hours of class time. Downloadable handouts and data spreadsheets are included.
https://www.sciencefriday.com/educational-resources/diy-groundwater-model/

STATE OF FLORIDA MANUFACTURED GAS PLANT ASSESSMENT AND REMEDIATION STATUS

McCarthy Jr., A.J.
Florida Department of Environmental Protection (FDEP), Tallahassee, FL. 40 pp, 2019

Through the use of reports, directories, maps, library research, and detective work, the FDER/FDEP CERCLA Group initially identified 24 locations of Florida MGPs. The list ultimately grew to 29 MGP and MGP dump sites, though at two of the sites, investigations showed none of the expected contamination. MGPs have been referred to variously as town gas plants and as coal gas or gasification plants. Through a heating process, MGPs used coal (or coke), steam, and a gasification agent (naphtha, Bunker C fuel oil, diesel fuel No. 6) to produce a combustible gas (hydrogen and carbon monoxide) for city street gas lights, home lighting, and stoves. Most MGP operations ceased in Florida by 1959 with the completion of the natural gas transmission lines. Waste products from MGP operations included tars, aqueous ammoniacal liquors, cyanide "Prussian Blue," and heavy metals. Coal tar contains numerous VOCs, such as BTEX and PAHs [e.g., benzo[a]pyrene]. Contamination of soil, surface water/sediment, and groundwater was common at the MGP sites.
https://floridadep.gov/sites/default/files/MGP-Assess-Remed-Status_03Feb19.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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