Technology Innovation News Survey

Entries for September 1-15, 2018

Market/Commercialization Information

DOE EM WEST VALLEY DEMONSTRATION PROJECT PHASE 1B DEACTIVATION AND DEMOLITION AND SOIL REMEDIATION

Department of Energy, Cincinnati, OH.
Federal Business Opportunities, FBO-6067, Solicitation 89303318NEM000015, 2018

DOE's Office of Environmental Management (EM) is in the acquisition planning stage for the potential contract award to complete the Phase 1B Deactivation & Demolition and Soil Remediation activities at DOE's West Valley Demonstration Project (WVDP) Site in western New York. Phase 1 decommissioning has been ongoing since August 2011 under the contract awarded to CH2M Hill-BWXT West Valley LLC. The purpose of this RFI is to solicit input via capability statements from interested parties with the specialized capabilities necessary to meet all of the major elements of scope for the future competitive procurement(s) for the WVDP Phase 1B requirements. A performance work statement is not available at this time, but the major elements of scope are identified on FedConnect at https://www.fedconnect.net/FedConnect/?doc=89303318NEM000015&agency=DOE [Note: It might be necessary to copy and paste the URL into your browser for direct access]. Additionally, DOE's EM Consolidated Business Center has created a WVDB procurement website at https://www.emcbc.doe.gov/seb/wvdpphase1/. DOE seeks feedback from contractors and other interested parties regarding end-state options for innovative approaches for the performance of the major elements of scope as well as insight into potential contracting alternatives. All interested parties, including small businesses, are invited to submit a capability statement (10 pages max) by 5:00 PM ET on November 1, 2018.
https://www.fbo.gov/spg/DOE/PAM/HQ/89303318NEM000015/listing.html

PEEKABOO MINE HAZMAT COLLECTION AND DISPOSAL

Department of Agriculture, Forest Service, R-2 White River National Forest, Glenwood Springs, CO.
Federal Business Opportunities, FBO-6069, Solicitation 1282D719Q0002, 2018

This requirement will be a total small business set-aside. The Pike-San Isabel National Forest has a requirement to collect and dispose of hazardous material and contaminated soil remaining at the abandoned Peekaboo Mine. The job site is not directly accessible with a vehicle. The mine is about 8 miles up a high-clearance 4WD road off Highway 82. Containers of unknown substances and contaminated soil must be packaged and carted over a temporary bridge back to the dirt road to be hauled out to the main road. Contract performance period is July 15-July 31, 2019. The COR will accompany the contractor throughout the collection period. The project is currently unfunded and is subject to funding availability. A non-mandatory pre-bid site visit is tentatively scheduled for Oct 22. Quotes are due by 5:00 PM ET on November 2, 2018. https://www.fbo.gov/notices/d439574a12ebf548d8e59b483881afc6

SUPERFUND HAZARDOUS SUBSTANCE RESEARCH AND TRAINING PROGRAM (P42 CLINICAL TRIAL OPTIONAL)

DHHS, National Institute of Environmental Health Sciences (NIEHS), RFA-ES-18-002

NIEHS is continuing to support the Superfund Hazardous Substance Research and Training Program, referred to as Superfund Research Program (SRP) Centers. The scope of the SRP Centers is taken directly from the Superfund Amendments and Reauthorization Act of 1986, and includes (1) advanced techniques for the detection, assessment, and evaluation of the effect on human health of hazardous substances; (2) methods to assess the risks to human health presented by hazardous substances; (3) methods and technologies to detect hazardous substances in the environment; and (4) basic biological, chemical, and physical methods to reduce the amount and toxicity of hazardous substances. See additional details at http://grants.nih.gov/grants/guide/rfa-files/RFA-ES-18-002.html. Those intending to participate must submit a letter of intent by November 19, 2018. The formal application is due by 5:00 PM on December 19, 2018. http://www.grants.gov/web/grants/view-opportunity.html?oppId=306773

IMPLEMENTATION OF THE COMPLIANCE/PREVENTION UNDERGROUND STORAGE TANK PROGRAM AND THE CLEANUP OF LEAKING UNDERGROUND STORAGE TANK PROGRAM

U.S. EPA, Funding Opportunity EPA-OLEM-OUST-18-04, 2018

EPA announces the availability of funds and solicits proposals to promote the prevention, identification, corrective action, and management of releases from federally regulated underground storage tanks (USTs) through training of state and tribal personnel, information exchange, dissemination of the results of studies and research electronically, and coordination that promotes cooperation among federal, state, and tribal programs. Funding under this announcement shall be used for activities that support state and tribal underground storage tank compliance/prevention programs and state and tribal leaking underground storage tank cleanup programs. The goals of these cooperative agreements are to provide states and tribes with training opportunities; technical information; communication exchange of research and demonstration projects; and a forum for federal, state, and tribal partners to give insights on lessons learned. See additional information at https://www.epa.gov/grants/implementation-compliancepreventionunderground-storage-tank-program-and-cleanup-leaking. The closing date for applications is November 15, 2018. Two awards are anticipated out of an estimated total program funding of $3.2M. Proposals will be accepted from public authorities (state, interstate, intrastate, agencies designated by states or territorial governors to receive UST notifications, federally recognized tribes, and intertribal consortia); public agencies and institutions; and private non-profit organizations and agencies that meet the requirements of Section 8001(a) and (b) of the Solid Waste Disposal Act. Profit-making organizations and the general public are not eligible.
http://www.grants.gov/web/grants/view-opportunity.html?oppId=309384

HANFORD CENTRAL PLATEAU CLEANUP CONTRACT: DRAFT REQUEST FOR PROPOSAL

U.S. Department of Energy, EM Consolidated Business Center, Cincinnati, OH.
Federal Business Opportunities, FBO-6054, Solicitation 89303318REM000008, 2018

U.S. DOE is releasing for review a Draft RFP for the Hanford Central Plateau Cleanup Contract procurement. The purpose of the Draft RFP is to elicit questions and comments from all interested parties, which will assist DOE in developing a final RFP for this procurement. For specific details, see the EMCBC acquisition website for this project — https://www.emcbc.doe.gov/SEB/CPCC/ — and FedConnect at https://www.fedconnect.net/FedConnect/?doc=89303318REM000008&agency=DOE [Note: It might be necessary to copy and paste the URL into your browser for direct access]. https://www.fbo.gov/spg/DOE/PAM/HQ/89303318REM000008/listing.html

Cleanup News

THE IMPACT OF SOIL VAPOR EXTRACTION AT MATERIAL DISPOSAL AREA L, LOS ALAMOS NATIONAL LABORATORY

Snyder, E.E., S. Marczak, L. Salazar, G. Fordham, S. Chu, D. Strobridge, K. Birdsell, et al.
WM2017: Waste Management Conference, March 5-9, 2017, Phoenix, Arizona. Paper 17155, 2017

Material Disposal Area L (MDA L) is an inactive liquid-waste disposal site located within the Los Alamos National Laboratory property. A subsurface vapor plume of VOCs is present in the unsaturated zone, and site remediation is recommended so that the plume will not affect groundwater in the future. Soil vapor extraction (SVE) using two extraction wells was conducted at the site for 10 months as an interim remediation measure. Plume size, concentrations vs. time and depth in monitoring wells, predicted vs. measured extraction concentrations, and plume rebound were measured to understand the impact of the interim measure and gather feedback on how to continue remediation. An existing model was recalibrated and used to predict plume behavior with field data collected during extraction. The SVE effort decreased vapor plume size by 60%. This paper presents results for the removal of VOCs from the subsurface and the spatially dependent reduction of VOC concentrations in the plume. http://www.wmsym.org/archives/2017/pdfs/FinalPaper_17155_0511115524.pdf

FINAL CLOSE-OUT REPORT, FRONTIER HARD CHROME SUPERFUND SITE, WAD53614988, CITY OF VANCOUVER, CLARK COUNTY, WASHINGTON

U.S. EPA Region 10, 81 pp, 2018

Chromium, the hazardous substance of primary concern at the FHC site, is present in two forms, Cr(III) and Cr(VI). Although the 1987 OU-1 ROD called for excavation, stabilization, and replacement of all soils with concentrations greater than 550 mg/kg total Cr (~7,400 yd^3 of soil) and the OU 2 ROD called for groundwater pump and treat from the area of greatest contamination (levels of Cr >50,000 µg/L), testing demonstrated the remedy would be insufficiently effective; hence, the remedy selected in the 2001 ROD Amendment was implemented in 2003. Injections of a blend of sodium dithionite and ferrous sulfate were performed to create an in situ redox manipulation (ISRM) treatment zone for the Cr-contaminated groundwater, followed by similar injections in source and hot spot areas. These treatments were effective. EPA issued a Notice of Deletion of the Frontier Hard Chrome Inc. Superfund Site from the National Priorities List on August 6, 2018. https://semspub.epa.gov/src/document/10/100092362 *Details of the ISRM field work are available in the 2003 remedial action report at*https://semspub.epa.gov/work/10/500010197.pdf.

ELECTROKINETIC IN-SITU REMEDIATION OF A 75 TONS XYLENE CONTAMINATION IN SOIL, BEDROCK AND GROUNDWATER

Hougaard, T. and J. Rose.
NORDROCS 2018: 7th Joint Nordic Meeting on Remediation of Contaminated Sites: Poster.

In situ electrokinetic (EK) remediation of severe xylene contamination is ongoing at a former paint production facility. The contamination hot spot lies beneath a former tank farm covering ~1000 m^2 to a depth of 25 m, holding some 75 tons of xylenes. The affected groundwater covers several ha. Site geology consists of sandy clay overlaying calcareous bedrock at ~6 m bgs. An unconfined groundwater table lays 20 m bgs. The aim of treatment is to lower xylene concentrations in soil, bedrock, and groundwater to levels accepted by the authorities as safe for residents and environment. The system consists of a central cathode and anodes placed ~20 m at each side of the cathode in a straight line. The electrodes, made of 160-mm mild steel pipes, are set to a depth of 30 m bgs. The electrodes are powered by a special power supply. System installation and startup began in late February 2018. After two months of operation the following results were observed: BTEX decreased by 42%, from 5.882 to 3.417 ppm; C_5-C_{10} decreased by 35%, from 9.650 to 6.257 ppm; C_{10}-C_{40} decreased by 74%, from 1.527 to 392 ppm; and C_5-C_{40} decreased by 41%, from 11.177 to 6.649 ppm. Within the treatment area, groundwater concentrations of BTEX and TPH increased ~75%, from 207 to 356 and 332 to 596 ppm, respectively. Outside the treatment area, concentrations 30 m downstream declined some 15%, from 60 to 50 and from 81 to 63 ppm, respectively. EK proved a viable, efficient, and cost-effective method for remediation of xylenes in soil, water, and bedrock. Costs, inconveniences for residents, and carbon footprint were lower compared to traditional in situ and dig and dump methods. Depending on cleanup criteria, however, time requirements for full remediation can be a hindrance, and the use of EK in organic-rich soils might cause settlement of soil and overlying construction due to mineralization of organic matter.

Demonstrations / Feasibility Studies

APPLICATION OF ALUM TO IMPROVE POST-DREDGING WATER QUALITY AT THE ASHLAND/NSP SUPERFUND SITE PILOT PROJECT

Garbaciak Jr., S., R. Onderko, D. Roznowski, S. Kozicki, M. Ciardelli, R. Brillhart, J. Morris, et al.
Dredging Summit & Expo '18 Proceedings, paper and 33 slides, 2018

The Ashland/NSP Superfund Site, located on the shore of Lake Superior's Chequamegon Bay, is the site of a former manufactured gas plant placed on the National Priorities List in 2002. EPA's 2009 ROD presented an Alternative Remedy to allow the entire site to have a full wet-dredge remedy if the wet-dredge pilot study to remove contaminated sediment using mechanical and/or hydraulic dredging equipment proved effective. The 2016 pilot study utilized a complex and innovative water quality barrier system comprising a breakwater and a series of carbon adsorption, full-depth, and bed-load baffle curtains to manage suspended solids and associated contaminant transport. A vital component of the pilot was to demonstrate that water quality standards were being met in time to allow demobilization of the barrier system before ice cover onset. To demobilize the barrier system, COC concentrations within the dredged area had to be below project-specific turbidity levels and State of Wisconsin surface water concentrations for PAHs. The project team determined that alum (aluminum sulfate) was able to reduce turbidity and decrease COC concentrations in an accelerated approach. This paper shares the results of bench-scale tests, column settling, and the field implementation of the selected plan.
Paper: https://www.westerndredging.org/phocadownload/2018_Norfolk/Proceedings/2b-2.pdf
Slides: https://www.westerndredging.org/phocadownload/2018_Norfolk/Presentations/2B_2.pdf

VALIDATION OF PASSIVE SAMPLING DEVICES FOR MONITORING OF MUNITIONS CONSTITUENTS IN UNDERWATER ENVIRONMENTS: ESTCP COST AND PERFORMANCE REPORT

Rosen, G., R. George, W. Wild, G. Lotufo, D. Smith, and J. Belden.
ESTCP Report ER-201433, 62 pp, 2018

This demonstration focused on field validation of commercially available passive sampling devices, specifically polar organic chemical-integrative samplers (POCIS), optimized in lab studies for detection and quantification of munitions constituents under environmentally relevant conditions. A full field validation study was conducted for underwater munitions in the Live Impact Area at the Naval Training Range, Vieques, Puerto Rico.
https://www.serdp-estcp.org/content/download/47710/454826/file/ER-201433%20Cost%20&%20Performance%20Report.pdf

VALIDATION OF STABLE ISOTOPE RATIO ANALYSIS TO DOCUMENT THE BIODEGRADATION AND NATURAL ATTENUATION OF RDX

Hatzinger, P., M. Fuller, N.C. Sturchio, and J.K. Boehlke.
ESTCP Project ER-201208, 144 pp, 2018

RDX contamination often occurs over expansive areas where in situ or ex situ treatment technologies are difficult to implement and evidence of nitramine biodegradation under field conditions is difficult to determine, as rates may be relatively slow. The project objective was to validate a compound-specific stable isotope analysis (CSIA) method to confirm and constrain rates of aerobic and anaerobic biodegradation of RDX at field sites. This technique can be utilized to provide critical data to support monitored natural attenuation as a remedy for treating RDX in groundwater and to confirm the effectiveness of in situ enhanced bioremediation remedies. https://www.serdp-estcp.org/content/download/47834/455829/file/ER-201208%20Final%20Report.pdf

WATERFRONT TORONTO: OVERVIEW OF BENCH AND PILOT-SCALE TESTING

Janes, M.
Smart Remediation Toronto, January 25, 2018. 17 slides, 2018

Formerly a large natural wetland, the 356-ha Port Lands area was infilled in the early 1900s to make more land available to serve Toronto's growing industrial sector and shipping needs. To complete brownfields revitalization and protect the area from flooding, over 1 million m^3 of soil will be excavated to create a new river valley. A portion of the soil will be reused to construct flood protection walls. Waterfront Toronto has been testing in situ technologies that remediate or stabilize NAPL within the project area, prior to the initiation of the excavation work. Key components of the project are to prevent any NAPL migration to the future river valley, reduce over-excavation for channel design slopes, and treat excavated and dredged material to levels that allow its reuse within the project area. Innovative but proven technologies are being tested for soil remediation. Ten bench-scale studies were completed and six pilot tests are underway to evaluate and maximize options for soil reuse. Results of the bench-scale studies are reviewed and an overview of interim pilot results is presented. A combination of in situ and ex situ soil remediation strategies will likely be implemented.
http://www.smartremediation.com/wp-contentsmart/uploads/2018/03/SMART-Remediation-Toronto-2018-Meggen-Janes.pdf

EXTENDING THE GEOGRAPHIC REACH OF THE WATER HYACINTH PLANT IN REMOVAL OF HEAVY METALS FROM A TEMPERATE NORTHERN HEMISPHERE RIVER

Jones, J.L., R.O. Jenkins, and P.I. Haris.
Nature: Scientific Reports 8:11071(2018)

The potential of the invasive water hyacinth (*Eichhornia crassipes*) for cleanup of water from a highly polluted British river (Nant-YFendrod, a tributary of the River Tawe) was investigated at three levels: a bench-scale study using polluted river water and synthetic solutions; an in situ trial using water hyacinth within the Nant-Y-Fendrod; and a bankside trial to pump and treat river water. The removal of a large number of heavy metals (21) from water is reported, including Sb. Bench-scale tests achieved up to 63% removal of Al, 62% Zn, 47% Cd, 22% Mn, and 23% As during just 7 h exposure to the plant. With exposure extended to 3 weeks, removal occurred in the order Al > Cd > Zn > Mn > Ni > As, and in situ mean removal of 6% Mn, 11% Zn, and 15% Cd was demonstrated.
https://www.nature.com/articles/s41598-018-29387-6.pdf
See additional information on this study at https://theconversation.com/invasive-tropical-plant-removed-metal-pollutants-from-british-river-new-study-100403.

PILOT SCALE APPLICATIONS OF MICROWAVE HEATING FOR SOIL REMEDIATION

Krouzek, J., V. Durdak, J. Hendrych, P. Masin, J. Sobek, and P. Spacek.
Chemical Engineering and Processing - Process Intensification 130:53-60(2018)

Researchers developed and tested microwave heating pilot units for three soil remediation applications: in a kiln, in contaminated surface soil, and in contaminated subsurface soil. The pilots included an efficient off-gas treatment system. The pilot tests were performed using 6kW 2.45 GHz industrial microwave generators to treat materials from several contaminated sites. During the study, detailed spatial temperature and contaminants mass distribution were measured in the tested material. Pilot results confirmed promising data from earlier lab tests; high efficiencies of different contaminant removals were achieved at mild temperatures and with low energy consumption. The empirical knowledge gained allowed the determination of practical limitations for further scale-up and field application or for validation of future numerical models.

Research

DEVELOPMENT OF AN IRON-BASED SOIL MIXING REMEDIATION METHOD FOR ENERGY-EFFICIENT TREATMENT OF CHLORINATED SOLVENTS

Lindh, P., A. Aberg, W. Rankka, F. Burman, C. Toomvali, E. Bergstedt, A. Toft, and K. Hanzi.
NORDROCS 2018: 7th Joint Nordic Meeting on Remediation of Contaminated Sites: Abstracts.

The Danish authority Region Hovedstaden developed and tested a remediation technique based on in situ mixing of a zero-valent iron and bentonite slurry into soil. The technique reduced the presence of chlorinated solvents by chemical oxidation on the iron surfaces. Although mixing reduced the contaminant source term efficiently, the treated soil had reduced strength due to the bentonite amendment, which limited possible soil use alternatives post treatment. In 2017 Region Hovedstaden partnered with the Swedish Geotechnical Institute and the Swedish Geological Survey on a sustainable soil mixing innovation project to improve the geotechnical and energy efficiency performance of the technique and to demonstrate the new functions in situ. The project consists of two different

phases: a lab phase in 2018 to study how different binder combinations affect strength and the chemical degradation efficiency of TCE, and a pilot phase in 2019 to test the improved technique at two field sites. The final aim is to produce a technical guideline for stakeholders to facilitate acceptance and implementation of the technique. Selected binder recipes are presented that will be tested on Danish and Swedish field sites in 2019. *See* ***slides 26-44*** *at* http://nordrocs.org/wp-content/uploads/2018/09/Session-B-Remediation-of-Soil-and-Groundwater.pdf.

CONSTRUCTION OF A SELF-POWERED SYSTEM FOR SIMULTANEOUS IN SITU REMEDIATION OF NITRATE AND CR(VI) CONTAMINATED SYNTHETIC GROUNDWATER AND RIVER SEDIMENT

Han, L., R. Liu, M. Li, N. Zhang, F. Zhang, and X. Liu.
Sustainability 10(8):Paper 2806(2018)

A novel self-powered system was constructed to remove nitrate and Cr(VI) from synthetic groundwater in situ and achieve their simultaneous remediation in river sediment. The sediment organic matter in an anodic chamber provided a carbon source for self-powered energy to reduce the cathode's contaminants. With the acceptance of protons and electrons, nitrate and Cr(VI) were transformed into nitrite and Cr(III), respectively. In a 72-h test in the presence of both nitrate and Cr(VI), the system removed nitrate at a rate of 70.96 mg/m^3/h and Cr(VI) at a rate of 8.95 mg/m^3/h. When a phosphate buffer was used in the test, the removal rates changed to 140.83 mg/m^3/h and 8.33 mg/m^3/h, respectively. Results demonstrated that the self-powered system could achieve simultaneous reduction of nitrate and Cr(VI) with no need for additional energy or materials, although the presence of Cr(VI) hindered nitrate reduction. *This paper is* ***Open Access*** *at* https://www.mdpi.com/2071-1050/10/8/2806.

GENERATING FALSE NEGATIVES AND FALSE POSITIVES FOR AS AND MO CONCENTRATIONS IN GROUNDWATER DUE TO WELL INSTALLATION

Wallis, I. and T. Pichler.
Science of the Total Environment 631-632:723-732(2018)

Following installation of 20 monitoring wells in close geographic proximity in central Florida, opposing concentration trends for As and Mo were observed. In the first yr after well installation, As and Mo concentrations increased in some wells by a factor of 2 and in others decreased by a factor of up to 100. Given this relatively short period of time, a natural change in groundwater composition of such magnitude was not expected, leaving well installation itself as the likely cause for the observed concentration changes. Generally, As and Mo were present in the aquifer matrix in either pyrite or organic matter, both of which are susceptible to dissolution if redox conditions change due to the addition of oxygen. Thus, introduction of an oxidant into an anoxic aquifer through use of an oxygen-saturated drilling fluid served as the conceptual model for the trends where concentrations decreased with time. Mixing between drilling fluid and groundwater (i.e., dilution) was used as the conceptual model for scenarios where increasing trends were observed. Conceptual models were successfully tested through formulation and application of data-driven reactive transport models using the USGS code MODFLOW in conjunction with the reactive multicomponent transport code PHT3D.

EVALUATION OF STRATEGIES TO MINIMIZE ECOTOXIC SIDE-EFFECTS OF SORBENT-BASED SEDIMENT REMEDIATION

Han, Z., S. Abel, J. Akkanen, and D. Werner.
Journal of Chemical Technology and Biotechnology 92(8):1938-1942(2017)

Concerns about ecotoxic side-effects of the most commonly used environmental sorbent, activated carbon, on sensitive, sediment-dwelling organisms like *Lumbriculus variegates* potentially limit its wider application. Using River Tyne sediment polluted with PAHs as a case study, sorbent alternatives and magnetic sorbent recovery were investigated as potential engineering strategies to mitigate ecotoxic side-effects on *L. variegates*. The study included an evaluation of the potential benefits of contacting the treated sediment with fresh River Tyne water to begin its ecological restoration, as would naturally occur over time in the intended applications. *This paper is* ***Open Access*** *at* https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5516141/?tool=pmcentrez&report=abstract.

APPLICATION OF OZONE MICRO-NANO-BUBBLES TO GROUNDWATER REMEDIATION

Hu, L. and Z. Xia.
Journal of Hazardous Materials 342:446-453(2018)

The efficiency of ozone in groundwater remediation is limited by its relatively low solubility and rapid decomposition in the aqueous phase. In this study, the characteristics of ozone micro-nano-bubbles (MNBs) were examined, including their size distribution, bubble quantity, and zeta potential. The mass transfer rate of ozone MNBs was experimentally investigated, and column tests were also conducted to study the efficiency of ozone MNBs for organics-contaminated groundwater remediation. Based on the lab tests, field monitoring was conducted on a TCE-contaminated site, where results indicated that ozone MNBs improved remediation efficiency. *Additional information on this technology is available in a U.S. patent application at* https://patents.google.com/patent/US20150041392.

SUSTAINABILITY INDEX FOR COMPARISON OF ENVIRONMENTAL REMEDIATION TECHNOLOGIES

Bird, S., A. Smoot, and A. Kramer.
WM2017: Waste Management Conference, March 5-9, 2017, Phoenix, Arizona. Paper 17492, 2017

The sustainability index is a quantitative test developed in response to a study published by scientists at the Hanford Site that details an exit strategy for pump-and-treat (P&T) remediation technologies. The aim is to move away from active remediation in favor of passive techniques. The sustainability index attempts to quantify the relative sustainability of active and passive remediation strategies by examining 10 metrics encompassing environmental, social, and economic aspects of sustainability and perspectives from those involved in the decision-making process. Data from active and passive remediation technologies evaluated at Mound, Ohio [P&T vs. oil injection] suggests passive remediation technologies performed better in terms of sustainability performance than active technologies. Passive remediation techniques can aid in the conservation of local ecosystems, reduce community impacts and improve perception of the cleanup, lower the lifecycle cost of the project, and contribute positively to sustainability by using less energy and fewer raw materials.
http://www.wmsym.org/archives/2017/pdfs/FinalPaper_17492_0427040838.pdf

EPRI REPORT: REVIEW OF GEOSTATISTICAL APPROACHES TO CHARACTERIZATION OF SUBSURFACE CONTAMINATION

McGrath, R., R. Reid, and P. Tran.
WM2017: Waste Management Conference, March 5-9, 2017, Phoenix, Arizona. Paper 17442, 2017

The key metric in the final release of a nuclear facility from radiological controls following decommissioning is the potential long-term radiation exposure to future users of the site. This is estimated from modeling of the exposure that could conceivably result from residual contamination remaining on the site in buildings, soil, and groundwater after the completion of decontamination, dismantlement, and remediation activities. A key modeling input is characterization data obtained from surveys and sampling. Regulatory guidance for conducting the final status survey required to show compliance with regulator-approved site release limits (i.e., radionuclide concentrations or contamination levels) has been limited to surface contamination. The Electric Power Research Institute (EPRI) conducted a project to provide information for using geostatistics in the development of a site final status survey that addresses the impact of dose from subsurface contamination to a future user of the site. EPRI Report No. 3002007554, *Guidance for Using Geostatistics in Developing a Site Final Status Survey Program for Plant Decommissioning*, was developed to provide background on geostatistics capabilities and cost-effective use to help design characterization and final status surveys for subsurface areas at nuclear facilities. http://www.wmsym.org/archives/2017/pdfs/FinalPaper_17442_0206011615.pdf

SUSTAINABLE REMOVAL OF POLY- AND PER-FLUOROALKYL SUBSTANCES (PFAS) FROM GROUNDWATER USING REGENERABLE ION EXCHANGE MEDIA AND ON-SITE DESTRUCTION OF PFAS BY PLASMA TREATMENT

Hagelin, N.
Emerging Contaminants Summit, 6-7 March 2018, Westminster, CO. Poster Presentation, 2018

Bench-scale column testing of five commercially available ion-exchange (IX) resin media, two regenerable and three non-regenerable, was conducted using groundwater contaminated with PFASs from aqueous film-forming foam during fire-fighter training. All five IX media removed PFASs, with non-regenerable media out-performing regenerable media. One of the regenerable materials—SORBIX A3F—was successfully regenerated and retained for pilot testing. Identical systems were designed for both synthetic media and GAC at pilot scale to treat groundwater with total PFAS concentrations of ~100 µg/L. The SORBIX A3F was regenerated and reused on site multiple times with negligible performance degradation. The regenerant residue was destroyed in a plasma reactor. Bench- and pilot-scale testing of IX resin for PFAS removal from groundwater suggests that the optimal IX solution depends on PFAS profile, PFAS concentration, and co-contaminants. *See additional information in a slide presentation*:
https://www.azwater.org/resource/group/25c2bfe3-42d4-4cd3-9149-4911c8416e5e/Downloads/2016-11-09_Webinar/AZAWWA_PFAS_IX_Removal.pdf.

LOW COST INDIGENOUS TECHNOLOGIES FOR REMOVAL OF ARSENIC FROM DRINKING WATER: CASE STUDY OF PAKISTAN

Bhatti, Z.A., K. Qureshi, M.Y. Khuhawar, A.W. Bhutto, Z.A. Solangi, and I.N. Unar.
International Journal of Recent Research and Applied Studies 34(3):66-77(2018)

This review presents an overview of naturally occurring As in water resources and then discusses techniques adapted to treat As-contaminated water. The focus is on low-cost indigenous technologies that can be easily adopted, especially in remote areas.
https://www.arpapress.com/Volumes/Vol34Issue3/IJRRAS_34_3_01.pdf

APPLICATION OF ACTIVATED PERSULFATE PROCESSES FOR THE TREATMENT OF WATER AND HIGH-STRENGTH WASTEWATER

Kattel, Eneliis, Ph.D. thesis, Tallinn University of Technology, Estonia. 105 pp, 2018

Persulfate is a strong and stable oxidant that needs extra activation to generate sulfate radicals that reduce organic pollution. The productivity of sulfate radicals from persulfate can be influenced by the type of activation employed, e.g., metallic ions, heat, radiation, oxidant, and increased pH. This project provided an overview of persulfate activation methods with application examples of the degradation of different compounds at wide concentration ranges in aqueous matrices that included ultrapure water, groundwater, and wastewater. The most viable activators, such as ferrous iron, chelated ferrous iron, and UV light, were chosen for studies in this research with the aim to implement these processes in situ in future. https://digi.lib.ttu.ee/i/file.php?DLID=9958&t=1

WET OXIDATION OF FINE SOIL CONTAMINATED WITH PETROLEUM HYDROCARBONS: A WAY TOWARDS A REMEDIATION CYCLE

Collivignarelli, M.C., M. Vaccari, A. Abba, M. Canato, and S. Sorlini.
Environments 5(6):Article 69(2018)

Typical wet oxidation (WO) treatment conditions for sludge and hazardous wastes reported in the literature are as follows: 200-325°C, 5000-17,500 kPa pressure, and 15-120 min reaction time. In an assessment of the feasibility of using a WO process for treating fine soil with a high level of total petroleum hydrocarbons (TPHs), one soil sample was spiked with motor oil and the other with motor oil + diesel. The samples were subjected to a WO bench plant test to investigate the effect of temperature and reaction time on TPHs removal. Independent of the kind of contamination (motor oil or a mix of motor oil and diesel), 250°C represents the temperature at which the normative constraint of 750 mg(TPHs)/kg$_{dw}$ can be reached. A strong reduction (>85%) was obtained with the typical working conditions of a full-scale plant (250°C and 30 min reaction time). Characterization of the solid residue resulting from the WO process to evaluate recovery options showed that contaminant content complied with Italian regulations for commercial and industrial site use. *This paper is* ***Open Access*** *at* https://www.mdpi.com/2076-3298/5/6/69.

General News

FINANCING MODELS FOR SOIL REMEDIATION

International Institute for Sustainable Development, Winnipeg, Manitoba, Canada.

The following reports are the outputs of a four-year project on financing models for soil remediation. The project objective is to harness the full range of green finance approaches and vehicles to manage the risks associated with contaminated soils and fund their remediation. Learn more at https://www.iisd.org/project/financing-models-soil-remediation-china.

Financing Soil Remediation: Exploring the Use of Financing Instruments to Blend Public and Private Capital
Perera, O., L. Wuennenberg, D. Uzsoki, and A. Cuellar.
International Institute for Sustainable Development, Winnipeg, Manitoba, Canada. 74 pp, 2018

This report presents 17 case studies on a variety of financing instruments that blend public and private capital. Each case study includes a short discussion on the extent to which each instrument could be used to finance the remediation of contaminated soil.
https://www.iisd.org/sites/default/files/publications/financing-soil-remediation.pdf

Green Finance Approaches to Soil Remediation: International Examples
Furuseth, I.S., K.J. Kammler, W. Chen, F.M. Platjouw, Y. Lin, M. Jartun, T. Larssen, and M.L. Larsen.
International Inst. for Sustainable Development/Norwegian Inst. for Water Research. 113 pp, 2018

A remediation strategy intended to ameliorate contamination in a specific area often has different costs and different results when applied to the same ecosystem type in a different geographic area, depending on project size and regional or country-specific variations in workers' salaries and fuel costs. Focusing on seven different cases using different financial measures, this report documents and analyzes how different financing instruments have been used to support soil remediation projects. https://www.iisd.org/sites/default/files/publications/green-finance-soil-remediation-international.pdf

Financing Models for Soil Remediation in China
Dong, Z., A. Qu, Y. Duan, H. Li, Z. Yuan, and Z. Guo.
Chinese Academy for Environmental Planning (CAEP), 53 pp, 2018

According to the National Soil Pollution Survey carried out in 2014, over 16% of total soil in China is contaminated. Estimates of the cost of cleaning these contaminated soils run up to $1.3 trillion USD, more than 10% of China's annual GDP. By examining seven different types of soil remediation projects, this report presents the state-of-play of current soil remediation financing in China.
https://www.iisd.org/sites/default/files/publications/financing-models-soil-remediation-china.pdf

REMEDIATION AND LAND MANAGEMENT: RESEARCH MEETS PRACTICE — REMEDIATE INTERNATIONAL CONFERENCE, 19-20 SEPTEMBER 2018, QUEEN'S UNIVERSITY BELFAST

The REMEDIATE Innovative Training Network [http://www.remediate.eu/] comprises eight beneficiaries from five EU member states—the UK, Ireland, Germany, Denmark, and Italy—and 18 partner organizations. All participants in the project are committed to providing innovative research and training for more cost-effective and sustainable remediation of contaminated land. The network is a multidisciplinary collaboration between international research teams from academia and industry, each with complementary expertise in a wide range of site investigation and risk assessment technologies. The abstracts of this conference present the work across seven universities as organized in four themes: Contaminated Land Biology; Site Modeling, Risk Assessment and Risk Communication; Chemical Analysis, Monitoring and Prediction; and Advances in Land Management and Resource Recovery.
http://www.remediate.eu/RemediateFilestore/Conference2018/Filetoupload,835230,en.pdf

ZÜRICH STATEMENT ON FUTURE ACTIONS ON PER- AND POLYFLUOROALKYL SUBSTANCES (PFASS)

Ritscher, A., Z. Wang, M. Scheringer, J.M. Boucher, L. Ahrens, U. Berger, S. Bintein, et al.
Environmental Health Perspectives 126(8):Article 84502(2018)

Per- and polyfluoroalkyl substances (PFASs) have been detected globally in human and wildlife biomonitoring studies. To date, over 4,000 unique PFASs have been used in technical applications and consumer products. Some PFASs, such as PFOA and PFOS, have been investigated extensively and thus regulated, but for many other PFASs, knowledge about their current uses and hazards is still very limited or missing entirely. To address this problem and prepare an action plan for PFAS assessment and management in the coming years, a group of more than 50 international scientists and regulators held a two-day workshop in November 2017. The group identified the respective needs and common goals shared by scientific and policy communities, made recommendations for cooperative actions, and outlined how the science-policy interface regarding PFASs might be strengthened using new approaches for assessing and managing these highly persistent chemicals. https://ehp.niehs.nih.gov/doi/10.1289/EHP4158.

EVALUATION OF STORY MAPS TO ENHANCE PUBLIC ENGAGEMENT AND COMMUNICATION AT LEGACY MANAGEMENT SITES

Carpenter, C., D. Castillo, J. Linard, and M. Picel.
WM2017: Waste Management Conference, March 5-9, 2017, Phoenix, Arizona. Paper 17334, 2017

The mission of DOE's Office of Legacy Management (LM) is to fulfill the Department's post-closure responsibilities and ensure protection of human health and the environment. Accomplishing that mission currently requires managing 91 legacy sites across the country by performing efficient long-term surveillance and maintenance activities, preserving and making accessible historic site records, and identifying opportunities for beneficial reuse. Integral to the success of these activities is connecting and communicating effectively with the public, governments, and other interested parties, so much so that LM has elevated such engagement to one of its strategic goals for the next 10 years. LM is evaluating the use of story maps to communicate long-term surveillance and maintenance practices. Story maps employ multiple types of content to engage users through site narratives, illustrations of change over time, photos, videos, and embedded links to external sources of information. The ability to illustrate site complexities via graphics and geospatial data is useful to both staff and stakeholders. Story maps can be easily initiated and managed in real time by LM site managers. This paper describes test story maps that were developed for several sites to explore the capabilities of the tool and potential approaches for deploying the tool for the public.
http://www.wmsym.org/archives/2017/pdfs/FinalPaper_17334_0130101625.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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