

Technology Innovation News Survey

Entries for July 1-15, 2015

Market/Commercialization Information

RESEARCH & DEVELOPMENT IN PHYSICAL, ENGINEERING, AND LIFE SCIENCES
Department of the Army, Army Contracting Command, Aberdeen Proving Ground, MD.
Federal Business Opportunities, FBO-5009, Solicitation W9115R-15-R-CBAR, 2015

The U.S. Army Edgewood Chemical Biological Center (ECBC) provides executive management of Army and joint service nuclear, biological, and chemical research, development, and engineering programs. ECBC's Chemical Biological Applications and Risk Reduction (CBARR) business unit provides support to CB operations globally in the form of remediation, investigation, destruction, elimination, and full life cycle support. ECBC is conducting market research to identify potential sources for mission support services related to CBARR's environmental, safety, health, research, and project management activities. See the FedBizOpps notice for a detailed listing of potential service requirements to provide support in the following areas:

- Operations (e.g., fabricate, assemble, modify, and finish prototype hardware systems for fixed and mobile environmental testing and monitoring, waste collection and management, and the demilitarization of military chemical protective equipment).
- Research and Technology (e.g., perform sampling and analysis of air, water, soil, and other solid media samples for chemical warfare material).
- Program and Integration (e.g., perform and document hazard analyses associated with chemical agent, biological organisms and toxins, radiation and industrial operations, projects, and facilities).

Domestic small businesses are encouraged to submit white papers (10 pages or less) that describe experience and capabilities. White papers must be received by or before 5:00 PM ET on August 27, 2015.

<https://www.fbo.gov/notices/2463f3f3336e4a42787074eb34d4b>

PUBLICIZING THE ADDITION OF ITEMS NOT ON THE FEDERAL SUPPLY SCHEDULE

Department of the Air Force, AFICA-CONUS, San Antonio, TX.
Federal Business Opportunities, FBO-5012, 2015

Under GSA FSS 899-8, the Air Force Civil Engineer Center (AFCEC), San Antonio, is soliciting competitive small business set-aside General Services Administration (GSA) Task Orders. GSA FSS 899-8—Environmental Services, Remediation and Reclamation Services—is defined as follows: Remediation services include but are not limited to excavation, removal, and disposal of hazardous waste; site preparation, characterization, field investigation, conservation, and closures; wetland restoration; emergency response cleanup; underground storage tank/aboveground storage tank removal; air monitoring; soil vapor extraction; stabilization/solidification, bioventing, carbon absorption, reactive walls, containment, monitoring, reduction of hazardous waste sites, and unexploded ordnance removal; and remediation-related laboratory testing (e.g., biological, chemical, physical, pollution, and soil testing). Reclamation services include but are not limited to land, water, and refrigerant reclamation. Due to the nature of the remediation and reclamation services required by AFCEC, it is likely that orders issued under these GSA Task Orders will require items that are not on the Federal Supply Schedule (also referred to as open market items). Those interested in providing services under these requirements may contact small business GSA schedule holders under SIN 899-8 (the current small business count in the GSA e-library is 196). NAICS Code 562910.

Solicitation RFQ1004025 - Eastern — Place of Performance: Former Griffiss, Plattsburgh, Myrtle Beach, and England AFBs. RFQ1004025 tentatively will be awarded in the first quarter of FY2016.

Solicitation RFQ1004028 - Central — Place of Performance: Former Chanute and Reese AFBs, TX; Wurtsmith and K.I. Sawyer, MI. RFQ1004028 tentatively will be awarded in the second quarter of FY2016.

Solicitation RFQ1004029 - Western — Place of Performance: Former Castle, Norton, and Mather AFBs, CA. RFQ1004029 tentatively will be awarded in the first quarter of FY2016.

<https://www.fbo.gov/notices/63dd1109-18a5f8cadd0a3a8dc82b79e>

TANK CLOSURE CESIUM REMOVAL (TCR)

U.S. Department of Energy, Savannah River Remediation LLC, Aiken, SC.
Federal Business Opportunities, FBO-5012, Solicitation CRP-T, 2015

The legacy nuclear liquid waste (LW) system at DOE's Savannah River Site consists of several facilities to safely receive, store, treat, and permanently dispose of radioactive waste. The mission of Savannah River Remediation (SRR) is to treat and stabilize LW, close the older LW tanks, and assure continued progress in accordance with the Federal Facility Agreement commitments between DOE, U.S. EPA, and the State of South Carolina. A cesium removal process to support bulk waste removal efforts is needed to support and accelerate tank closure, and a readily deployable, supplemental cesium removal capability (ion exchange) has been determined to be advantageous in supporting this goal. The supplier will provide an ion exchange process that will remove radioactive cesium-137 from aqueous high-level waste (i.e., dissolved salt solution). The scope includes providing a method of preparing any spent ion exchange resin or eluted cesium for interim safe storage. The supplier must provide 24-hour technical support to assist SRR in nuclear safety analysis, hazards analysis, installation, start-up testing, system acceptance, training of SRR operations personnel, and operating procedures development. The supplier will provide materials and consumables (e.g., resin, vessels, containment systems, and equipment) to process 625,000 gallons of salt solution, which will contain ~100,000 grams of cesium-137. Proposals are due by or before 5 PM local time on September 11, 2015. <https://www.fbo.gov/notices/1a12180466806c415307939f3ba56c>

Cleanup News

MINE WATER TREATMENT OPTIONS FOR MEETING SELENIUM REGULATORY LIMITS

Rutkowski, T., R. Hanson, and K. Conroy.
West Virginia Mine Drainage Task Force Symposium, Morgantown, West Virginia, March 25-26, 2014. Abstract and 29 slides, 2014

Selenium can be a constituent of concern in mine waters and is often present in neutral waters. Selenium typically is leached from waste rock piles as the selenate ion, and mines can be faced with multiple high-flow contaminated discharges. In recent years, biological treatment has emerged as an effective and relatively inexpensive method compared to physical and chemical methods. With some waters, biological treatment alone is sufficient to achieve stringent regulatory limits, although additional unit processes are sometimes required. The slides show four case studies for treating moderate levels of influent selenium (50-500 µg/L). See an earlier paper by the authors on this topic at https://www.mimwa.info/docs/mimwa_2013/IMWA2013_Rutkowski_570.pdf

Slides: http://www.mimwa.info/docs/mimwa_2013/IMWA2013_Rutkowski_570.pdf

HALESTIE FORMER MGP, SUFFOLK COUNTY, NEW YORK: FINAL ENGINEERING REPORT

National Grid, Halestie Former MGP website, 65 pp, 2014

This report documents site remediation activities conducted between September 2008 and May 2009. The selected remedy specified removal of shallow soil (500 ppm total SVOCs in the area between the two Upland excavations. Based on the cumulative delineation sampling results, shallow soil was excavated to a uniform depth of ~2 ft below grade. Cleanup also included remediation of an off-site DNAPL source area located on the south-adjacent office building property. Contaminated soil from the property was excavated and transported off site for thermal treatment. An oxygen injection system was installed in the Lowland Area to enhance biodegradation of both groundwater contamination and residual soil contamination. The system consists of an oxygen injection equipment enclosure, which houses oxygen generation and distribution equipment, and a series of 23 oxygen injection well clusters installed around the perimeter of the electrical substation, connected via trenching tubed. A series of soil gas vapor points and groundwater monitoring wells was installed to facilitate monitoring of oxygen injection system performance. Eleven shallow NAPL recovery wells and two deep NAPL recovery wells were installed on ~40-ft centers in the Lowland area to facilitate passive NAPL recovery. http://halesstie.napco.com/Key_docs_reports.html See also the appendices and additional information on site management and system O&M at <http://halesstie.napco.com/>

REMEDIATION OF BAY SHORE FORMER MANUFACTURED GAS PLANT, SITE 1-52-172, BAY SHORE, NY

Bay Shore Works MGP website, 2015

Substantial remediation progress has been made since major construction began in 2007 to support the cleanup activities in Bay Shore. Since October 2012, National Grid conducted or continued remedial activities at all four of the site's operable units. Although cleanup is not complete, contaminant levels for BTEX and PAHs are down sharply throughout the site, and this trend is expected to continue. All major construction is complete. The work entailed excavation of source areas to ~16-25 ft based on field conditions; removal and off-site thermal desorption of contaminated soil; in situ chemical oxidation using ozone to treat residual contamination beneath the excavated areas; installation of a subsurface barrier wall at the downgradient edge of OU-1 with in situ groundwater treatment immediately upgradient of the barrier; recovery of mobile water gas tar and DNAPL via extraction wells where practicable; and extensive use of oxygen injection to enhance biodegradation. See the Bay Shore Works website for project reports and other information, including progress videos: <http://www.bayshoreworksmgp.com/>

DESIGN OF A REACTIVE CAP REMEDY FOR SOFT, NAPL-IMPACTED SEDIMENTS

Carroll, S. and W. Haswell.
Abstracts: Manufactured Gas Plant Conference 2015

A reactive cap was designed to address very soft sediments in the Grand Calumet River in Hammond, Indiana, that contain coal tar NAPL and elevated PAH and BTEX constituents. The design proposes two different cap sections for different reaches of the river: organoclay to address NAPL migration and dissolved-phase flux of PAHs, and bulk granular activated carbon to address dissolved-phase BTEX contaminants. The design was completed in 2014, and remedial construction is planned for winter 2015. The design approach, incorporating a wide array of inputs, such as hydraulic characteristics; groundwater to surface water flux measurements; sorbed-phase sediment and dissolved-phase pore water contaminant concentrations; NAPL saturation measurements; and gas ebullition rates as a result of microbial decay, including field and lab measurements of gas generation rates to quantify potential upward gas-driven NAPL flux. Several innovative technologies and methods were used to characterize conditions in the sediments, including laser-induced fluorescence Darts® (Dakota Technologies Inc.) to measure NAPL content in sediments, sorbent samplers to measure contaminant concentrations in pore water, installed in a wooden cell constructed in the river in 2012 and monitored for a year to obtain pre-design data. The collection of similar types of data using different methods (e.g., quantification of contaminant concentrations in pore water by conventional pore water sampling and analysis; pore water extraction from sediment cores coupled with solid-phase microextraction analysis; and ACl sorbent samplers) has allowed comparison of results obtained by the various methods. See additional information about this project in an article in International Dredging Review at <http://www.desdgenoa.com/September-October-2014/CI-58-Approaching-End-of-Grand-Calumet-River-Remediation-Project/>

Demonstrations / Feasibility Studies

DEMONSTRATION AND VALIDATION OF A FRACTURED ROCK PASSIVE FLUX METER

Hatfield, K.
ESTCP Project ER-200831, 195 pp, 2015

A new closed-hole passive sensing technology for fractured media, the Fractured Rock Passive Fluxmeter (FRPFM), provides simultaneous measurement of 1) the presence of flowing fractures; 2) the location of active or flowing fractures; 3) active fracture orientation, i.e., dip and azimuth; 4) direction of groundwater flow in each fracture; 5) cumulative magnitude of groundwater flux in each fracture; and 6) cumulative magnitude of contaminant flux in each fracture. Other technologies exist to measure 1, 2, and 3 above; however, the FRPFM is the only technology that also measures 4, 5, and 6. Field tests were conducted at two chlorinated solvent-contaminated fractured rock sites. In 16 field tests, the FRPFM achieved the stated goals in each of the 160 quantitative performance objectives. A cost assessment indicates that FRPFM implementation is competitive with alternative technologies, none of which can provide the full suite of FRPFM capabilities. A key distinction, however, is that the FRPFM generates high-resolution measures over a specified interval and is best used for characterizing targeted borehole depth intervals, not for screening conditions over an entire borehole. Enviroflux Inc. has exclusive rights to commercialize the FRPFM technology <https://www.estcp.com/content/dw/indiana/34821/335493Vfile/ER-200831-ER.pdf>

DEVELOPMENT OF MORE COST-EFFECTIVE METHODS FOR LONG-TERM MONITORING OF SOIL VAPOR INTRUSION TO INDOOR AIR USING QUANTITATIVE PASSIVE DIFFUSIVE-ADSORPTIVE SAMPLING

McAlary, T.
ESTCP Project ER-200830, 358 pp, 2014

This report documents a demonstration/validation of passive diffusive samplers for assessing soil vapor, indoor air, and outdoor air concentrations of VOCs at sites with potential human health risks attributable to subsurface vapor intrusion to indoor air. The passive samplers tested were the 1) SKC Ultra and Ultra II, 2) Radiello®, 3) Waterloo Membrane Sampler, 4) Automated Thermal Desorption tubes, and 5) 3M OVM 3500. The program included laboratory testing under controlled conditions for 10 VOCs (including chlorinated ethanes, ethanes, and methanes, and aromatic and aliphatic hydrocarbons) spanning a range of properties and including some compounds expected to pose challenges (naphthalene and methyl ethyl ketone). The samplers also were field tested on indoor air, outdoor air, subsurface vapor, and deeper soil vapor at several DoD facilities. All of the passive samplers provided data that met the success criteria under some or most conditions. Most of the passive samplers provided highly reproducible results throughout the demonstrations. Overall costs of monitoring with passive samplers were comparable to or lower than monitoring with conventional methods because of the simplicity of the sampling protocols and reduced shipping charges. The study team comprised individuals highly experienced with passive samplers in general and each of the five samplers tested in particular. <https://www.estcp.com/content/download/431761/4310778/FILE/ER-200830-ER.pdf>

IN SITU GEOCHEMICAL STABILIZATION PILOT STUDY WORK PLAN, PORT OF ASTORIA

Oregon Department of Environmental Quality, 33 pp, 2014

A pilot study will be conducted to evaluate in situ geochemical stabilization as a component to address the remedial action objectives specified in the 2010 Recommended Remedial Action produced by Oregon Department of Environmental Quality. The Port is in the process of completing a revised focused feasibility study (FFS). The pilot results are expected to inform the FFS with respect to the selection of a full-scale remedy for AOC 4. http://www.dep.state.or.us/WebPages/Content/Output/2014/Handiler_ashby?n=aqch1268-0604-4f8c-8f64-2c27d9593d5a.pdf&n=In%20Site%20Geochemical%20Stabilization%20Plan%20Final%20Study%20Plan%20December%2015.%202014%2

IN-SITU SMOLDING COMBUSTION FOR THE TREATMENT OF MANUFACTURED GAS PLANT IMPACTED SOILS WITHIN A FLOODPLAIN

Couch, J.N. and G. Grant. Abstracts: IAFSM 2015 Annual Conference, Illinois Association for Floodplain and Stormwater Management, 12-13 March 2015, Normal, IL.

Self-sustaining Treatment for Active Remediation (STAR) is an innovative remediation technology based on the principles of smoldering combustion where the contaminants are the source of fuel. The process is self-sustaining following a brief, low-energy-input "ignition event" such that the energy of the reacting contaminants preheats and initiates combustion of contaminants in the adjacent area, propagating a combustion front through the contaminated zone if given sufficient fuel of oxygen. In situ STAR was piloted tested at a former manufactured gas plant site in Ottawa, Illinois, adjacent to the Illinois River. The site exhibited a substantial coal tar-contaminated horizon between the bedrock and overburden interface at a depth of 15.5-18.5 ft bgs within a former mill race in floodplain environment along the river. The field pilot was designed to test STAR under saturated conditions (i.e., below the water table) to collect the data needed to support a full-scale remedial design. Results of a pre-design treatability study showed initial total petroleum hydrocarbon as high as 56,100 mg/kg reduced to as low as 150 mg/kg, more than one order of magnitude below Illinois residential cleanup criteria. See additional information on the use of this technology in a slide presentation at http://www.aigp.org/sections/GA/pdf/2014%20Seminar/7-Thompson_STAR_04%2016%2014.pdf

Research

AEROBIC DEGRADATION OF TRICHLOROETHYLENE BY CO-METABOLISM USING PHENOL AND GASOLINE AS GROWTH SUBSTRATES

Yan Li, Bing Li, Cui-Ping Wang, Jun-Zhao Fan and Hong-Wen Sun.
International Journal of Molecular Sciences, Vol 15, 9134-9148, 2014

In a study that used *Pseudomonas fluorescens* as the active microorganism to degrade TCE under aerobic condition by cometabolic degradation with phenol and gasoline growth substrates, the TCE cometabolic degradation rate reached a maximum of 80% under optimized conditions, i.e., initial 0.14 (1.26 x 10⁷ cell/mL) OD600 microbial culture, initial 100 mg/L phenol concentration, initial 0.1 mg/L TCE concentration, 6.0 pH, and 0.1% salinity at 3 days degradation time. The modified transformation capacity and transformation yield were 20 µg (TCE)/mg (biomass) and 5.1 µg (TCE)/mg (phenol), respectively. Addition of nutrient broth promoted TCE degradation with phenol as growth substrate. Catechol 1,2-dioxygenase played a major role in TCE cometabolic degradation. TCE cometabolic degradation was more efficient than cometabolic in the presence of gasoline; however, the degradation rate was not high (28%). When phenol was introduced into the TCE-gasoline system, TCE and gasoline could be removed at higher rates (up to 59% and 69%, respectively). <https://www.mdpi.com/1422-0067/15/5/9134/pdf>

BIOSURFACTANT-ENHANCED PHYTOREMEDIATION OF PB-CONTAMINATED SOIL BY BRASSICA JUNCEA

Gao, L. D., R. L. Zheng, and H. Imazu. Energy and Environment: Proceedings of the 2014 International Conference on Energy and Environment (ICEE 2014), June 26-27, Beijing, China. CRC Press, Boca Raton, FL. ISBN 978-1-138-02658-2, 39-46, 2015

An investigation of the effect of biosurfactants (saponin and sophorolipid) on phytoremediation of Pb-contaminated soil and sludge by *Brassica juncea* showed that (1) biosurfactants can enhance the phytoremediation effect of Pb-contaminated soil or sludge; (2) the biomass of *B. juncea* is affected by the kind, dosage, and timing of biosurfactant addition as well as the Pb concentration in soil and soil nature; (3) the biomass increase in shoot is larger than that in root with biosurfactant addition, whereas Pb concentration in shoot is lower than that in root. For additional information, see Chapter 4 (pp 82-107) in L. Gao's Ph.D. thesis at http://depce.lib.nipgta.ac.cn/depce/thesis/10151/140711/D_5_K_K300.pdf.

A FIELD STUDY ON PHYTOREMEDIATION OF DREDGED SEDIMENT CONTAMINATED BY HEAVY METALS AND NUTRIENTS: THE IMPACTS OF SEDIMENT AERATION

Wu, J., L. Yang, F. Zhong, and S. Cheng. Environmental Science & Pollution Research, Vol 21 No 23, 13452-13460, 2014

A field study was conducted in a sediment disposal site predominantly colonized by *Typha angustifolia* to estimate phytoremediation effects in aerated and waterlogged sediment with moisture content of 37.30% and 48.27%, respectively. Total nitrogen (TN) content was higher in the waterlogged sediment than in the aerated sediment. Total Cd content was lower in aerated sediment, mainly owing to the lower exchangeable fraction of Cd. Waterlogging promoted bioaccumulation of Pb, Cu, and Zn in *T. angustifolia* consistent with many previous studies. *T. angustifolia* showed higher metal levels in roots than in aboveground tissues at both sediment conditions. Due to the greater biomass produced in the aerated sediment, removal of nutrients and metals by plant harvest was higher from aerated sediment than from waterlogged sediment; however, maintaining aeration of dredged sediment can mitigate the risk of release and plant uptake of metals, while waterlogging can promote their phytoextraction.

IMPROVED TIME-LAPSE ELECTRICAL RESISTIVITY TOMOGRAPHY MONITORING OF DENSE NON-AQUEOUS PHASE LIQUIDS WITH SURFACE-TO-HORIZONTAL BOREHOLE ARRAYS

Power, C., J. Gerhart, P. Tsouris, K. Smyrdis, and M. Karoulis. Journal of Applied Geophysics, Vol 112, 1-13, 2015

This paper presents a novel surface-to-horizontal borehole (52HB) electrical resistivity tomography (ERT) configuration for DNAPL site investigations. This array configuration is combined with 4D inversion methods (applied on 2D time-lapse monitoring datasets) to explore the potential benefit of 52HB ERT for mapping the spatial and temporal evolution of DNAPL mass during remediation. A field-scale DNAPL remediation scenario first was simulated by a coupled DNAPL-ERT model, which demonstrated that 52HB ERT may provide significant improvements over surface ERT, particularly for delineating DNAPL mass removal at depth. A lab experiment validated the 52HB ERT approach in a physical system and confirmed that 4D 52HB ERT provides improved monitoring of NAPL changes. Confidence in the ERT responses obtained from the experiment was increased by direct distribution of NAPL mapped by excavation. Independent simulation of the experiment with the DNAPL-ERT model demonstrated that the model is reliable for simulating real systems. This initial study demonstrates significantly improved resistivity imaging with 52HB ERT and its potential as a nondestructive site characterization tool for mapping DNAPL mass changes during remediation. For additional information on this use of ERT, see C. Power's Ph.D. thesis at <http://ir.lib.uwo.ca/etd/2012/>.

INFLUENCE OF VERTICAL FLOWS IN WELLS ON GROUNDWATER SAMPLING

McMillan, L.A., M. Rivett, J.H. Tatem, P. Dumball, C.T.H. Sharp. Journal of Contaminant Hydrology, Vol 169, 50-61, 2014

The pumping rate used during sampling may not always be sufficient to overcome vertical flows in wells driven by ambient vertical head gradients. Such flows are reported in wells with screens between 3 and 10 m in length where lower pumping rates are more likely to be used during sampling. The authors use numerical flow and particle transport modeling to provide insight into the origin of samples under ambient vertical head gradients and under a range of pumping rates. When vertical gradients are present, sample provenance is sensitive to pump intake position, pumping rate, and pumping duration; the sample might not be drawn from the whole screen interval even with extended pumping times. Sample bias is present even when the ambient vertical flow in the wellbore is less than the pumping rate. Knowledge of the maximum ambient vertical flow in the well does, however, allow estimation of the pumping rate that will yield a permeability-weighted sample. This rate may be much greater than that recommended for low-flow sampling. In practice at monitored sites, the sampling bias introduced by ambient vertical flows in wells may often be unrecognized or underestimated when drawing conclusions from sampling results. This paper is **Open Access** at <http://www.sciencedirect.com/science/article/pii/S0169772214000655>.

REMEDICATION OF AS, PAH AND METAL CONTAMINATED SOIL USING SOIL WASHING WITH ORGANIC ACIDS

Jernberg, Camilla, Master's thesis, Lulea University of Technology, Sweden, 55 pp, 2014

This thesis explores the possibilities of using acidogenic leachate generated from municipal solid waste (mainly food waste) as an extractant in the soil washing process, and subsequently assessing the efficiency of cleaning the contaminated leachate using a digested sludge filter. No other chemicals are needed, the digested sludge is re-used, and the acidogenic leachate could be recycled. Results indicate that washing with acidogenic leachate is more effective than water for the analyzed elements, except for zinc; soil type is critical for removal efficiency, and although promising, acidogenic leachate soil washing did not achieve the removal rates of organic acids presented in the literature. <http://pure.ltu.se/portal/files/1006937471/TL-FX-2014-100387009.pdf>

SOIL WASHING, OZOFRACTIONATION AND METAL SEQUESTRATION: REMOVING ORGANIC AND INORGANIC SPECIES FROM CONTAMINATED SOIL AND WATER

Fergusson, L. International Journal of Multidisciplinary Research & Development, Vol 2 No 4, 574-579, 2015

This project assessed the capacity of soil washing using the surfactant sodium lauryl sulfate to remove both organic and inorganic species from a complex contaminated industrial soil, and once contaminants were liberated from the solid phase to examine their chemical oxidation (ISCO) and metal precipitation components. Publications describing ISCO treatment results on HBB and 4,4-DDT (PSA-3) and BEHP (PSA-4) are not readily available, and lab treatability testing will be required to determine if ISCO is a potentially effective treatment technology for any of these constituents. This memo summarizes the findings of the literature review on ISCO treatment for HBB, 4,4-DDT, and BEHP as well as potential alternate remediation technologies for these materials. <http://www.aisubjectjournal.com/archives/2015/vol2issue4/PartL/76.pdf>

PRESSURE-ASSISTED CYCLIC WASHING OF HEAVY-METAL-CONTAMINATED SEDIMENTS

Lin, C.E., P.K.A. R.V. Surampudi, C.T. Lin, and C.M. Kao. International Journal of Environmental Science and Technology, Vol 11 No 4, 1017-1026, 2014

A novel extraction/washing technique utilizing chelating agent (EDTA) and elevated pressure in consecutive cycles of compression and decompression was developed for washing heavy-metal-contaminated sediment. Optimal operational conditions of pressure-assisted cyclic washing of Cu-contaminated sediments (initial Cu concentration = 23.177 mg/kg) were determined for applied pressure level, washing time, EDTA concentration (0.01-0.5 M), pressure times, and washing in consecutive batches. Results showed that up to 70% Cu can be washed from sediments at 10 atm pressure. Efficiency dropped to 55% when the pressure dropped to 6 atm. Under the same operational conditions, the optimal cyclic washing time was 60 min. Mean particle size dropped from 100 to 50 µm after washing, indicating that cyclic pressure caused the fracture of sediment aggregates, resulting in the exposure of Cu to chelating agents. With the assistance of a pressure cyclic system, the total washing time and amount of chemical agent used can be reduced significantly. <http://www.balinen.com.br/pdf/14110>

LITERATURE SEARCH ON CHEMICAL OXIDATION AND RELATED TECHNOLOGIES FOR KEY COCS IN PSA-3 AND PSA-4 AT VELVICOL CHEMICAL CORPORATION SUPERFUND SITE, ST. LOUIS, MICHIGAN

U.S. EPA Region 5, 20 pp, 2015

This technical memorandum is associated with the selected remedy for the specific contaminants in OU1 groundwater at Velvicol Chemical Corporation/Pine River Superfund site as defined in the 2012 ROD for OU1. Site contaminants in saturated soil are DBCP, total DDT, HBB, chlorobenzene, TRIS, and xylene, and key contaminants in groundwater are BEHP, DDT, HBB, DBCP, 1,2-DCA, chlorobenzene, TRIS, and xylene. The OUI ROD calls for treatment of potential source areas using *in situ* chemical oxidation (ISCO), in addition to other remedy components. Publications describing ISCO treatment results on HBB and 4,4-DDT (PSA-3) and BEHP (PSA-4) are not readily available, and lab treatability testing will be required to determine if ISCO is a potentially effective treatment technology for any of these constituents. This memo summarizes the findings of the literature review on ISCO treatment for HBB, 4,4-DDT, and BEHP as well as potential alternate remediation technologies for these materials. <http://www.epa.gov/region5/cleanup/velvicolmichigan/pdfs/velvicol-miscon-literature-search-201507.pdf>

ALUMINUM REMOVAL: FIELD TRIALS AT WVDEP SPECIAL RECLAMATION SITES

Ziemkiewicz, P., and T. He. West Virginia Mine Drainage Task Force Symposium, Morgantown, West Virginia, March 25-26, 2014. Abstract and 27 slides, 2014

The West Virginia Special Reclamation Program has undertaken to identify cost-effective and efficient treatment methods to reduce Al in the discharges from abandoned mine lands reclamation sites to a level that would meet anticipated NPDES permit requirements. In tests, a polymer sponge material (Bio-Blox™) and fiberglass insulation were moderately effective in removing Al, whereas stainless steel wool consistently removed Al to below the anticipated NPDES permit limit (0.75 mg/L) for non-trout waters. For all media, treatment performance was strongly dependent on pH; within the optimal range of 5.6 to 8.5, 100% of observations were met. <http://wvmdtaskforce.com/proceedings/14/Ziemkiewicz-He-1600-Al-field-treatment.pdf>

General News

PERFLUORINATED CHEMICALS (PFCS): PERFLUOROACETIC ACID (PFOA) & PERFLUOROOCTANE SULFONATE (PFOS): INFORMATION PAPER

Association of State and Territorial Solid Waste Management Officials (ASTSWMO), Federal Facilities Research Center, Remediation and Reuse Focus Group, 68 pp, 2015

Although many chemicals fall into the generic family of perfluorinated compounds (PFCs), this paper focuses on PFOA and PFOS, the two PFCs most commonly researched and most prevalent in the environment. This document introduces information and resources specific to PFCs and their persistence in the environment; summarizes policy and program decisions implemented at federal facilities and other cleanup sites within the United States; and presents a case study of PFAS contamination at the former Wurtsmith Air Force Base. http://www.astswmo.org/Files/Polinics_and_Publications/Federal_Facilities/2015-08-ASTSWMO-PFCS-IssuePaper-Final.pdf

WELL DESIGN AND CONSTRUCTION FOR MONITORING GROUNDWATER AT CONTAMINATED SITES

Hughes, E., G. Aarons, et al. California Environmental Protection Agency, Department of Toxic Substances Control, 95 pp, 2014

This document presents a recommended approach to designing and constructing monitoring wells for groundwater investigations at contaminated sites in California. The state of practice of environmental characterization has changed substantially since 1995, when California released its original recommendations, and this revision updates the original guide with regard to recent developments. https://www.dtsc.ca.gov/Publications/Forms/upload/Well_Design_Constr_for_Monitoring_GWContam_Sites.pdf

GROUNDWATER MODELING

Michigan Dept. of Environmental Quality, Remediation and Redevelopment Division, RRD-Resource Materials-25-2013-01, 52 pp, 2014

Models have been applied to evaluate many aspects of the impact of remedial or corrective actions on groundwater contamination, including determining the effectiveness of hydraulic containment systems, estimating contaminant removal rate and cleanup time, evaluating the potential impact to downgradient receptors such as surface water bodies or potable water supply wells, and predicting contaminant concentrations for natural attenuation remedies. It is important to understand that models are conceptual descriptions (approximations) that describe physical systems through the use of mathematical equations; they are not exact descriptions of physical systems or processes. The applicability or usefulness of a model depends on how closely the mathematical equations approximate the physical system being modeled; hence, models based on a thorough understanding of the physical system and the assumptions embedded in the derivation of the mathematical equations produce better predictions. https://www.michigan.gov/documents/dm/nien-tri-groundwater-modeling-guidance_447643_7.pdf

USER'S MANUAL FOR THE QUICK DOMENICO GROUNDWATER FATE-AND-TRANSPORT MODEL

Brown, C.D., Pennsylvania Dept. of Environmental Protection, 34 pp, 2014

This Quick Domenico user's manual documents the application of QD to groundwater fate-and-transport problems and is intended to encourage more consistent use of the model. It should help users appreciate the many factors that come into play with modeling. It has been written with an emphasis on the use of sound science and a conservative approach in guidance-and-transport analyses. Professional judgment is required in deciding how to apply QD to each site. http://files.dep.state.pa.us/Environment/Cleanup/Brownfields/andRecyclingProgram/andRecyclingProgramPortalFiles/GuidanceTechTools/QD_manual_v3h0207-28-2014.pdf

HEAVY METAL CONTAMINATION OF SOILS: MONITORING AND REMEDIATION

Sheremet, I., and A. Varma (eds). Springer, New York, ISBN: 978-1-319-14525-9, 2015

Following a description of the various sources and factors that influence heavy metal content in post-catastrophic and agricultural soils, subsequent chapters examine soil enzymes and eggs as bio-monitors, lead adsorption, the effects of arsenic on microbial diversity, and the effects of Mediterranean grasslands on abandoned mines. A third section focuses on the adaptation strategies used by plants and bacteria, such as *Pinus sylvestris* in industrial areas and rhizospheres changes in contaminated tropical soils and soil treated with sewage sludge. Other topics include strategies of bioremediation, such as using transgenic plants as tools for soil remediation. View the table of contents and abstracts of the 24 chapters at <http://www.springer.com/us/book/9781319145259>.

SUSTAINABLE REMEDIATION OF CONTAMINATED SITES

Reddy, K. and J.A. Adams. Momentum Press, ISBN-13: 978-1606505205; ISBN-10: 1606505203, 160 pp, 2015

Traditional site remediation approaches typically focus on the reduction of containment concentrations to meet cleanup goals or risk-based corrective levels, with a primary emphasis on remediation program cost and timeframe. In contrast to a traditional remediation approach, green and sustainable remediation is a holistic remediation approach that considers ancillary environmental impacts and aims to optimize net effects to the environment. The objective of the approach is to achieve remedial goals through more efficient, sustainable strategies that conserve resources and protect air, water, and soil quality through reduced emissions and other waste burdens. Green and sustainable remediation also simultaneously encourages the reuse of remediated land and enhanced long-term financial returns for investments. This text describes the green and sustainable remediation decision framework; presents qualitative and quantitative assessment tools, including multi-disciplinary metrics, to assess remedial approach sustainability; and reviews potential new technologies. The book also presents several case studies and highlights the challenges in promoting this practice. The introduction and table of contents can be viewed at <http://www.momentumpress.net/books/sustainable-remediation-contaminated-sites>.

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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