

Technology Innovation News Survey

Entries for January 1-15, 2016

Market/Commercialization Information

ESTCP FY 2017 SOLICITATIONS

Environmental Security Technology Certification Program (ESTCP) website, 2016

Among the seven specific topics for which the latest ESTCP Broad Agency Announcement requests preproposals are the following three cleanup topics:

- In situ management of contaminated aquatic sediments.
- Reduced source loading of munitions constituents.
- Detection, classification, and remediation of military munitions in underwater environments.

All preproposals are due by 2:00 PM ET on April 5, 2016. More information about the solicitations, including instructions and deadlines, is available on the ESTCP website under Funding Opportunities at <https://www.estcp.gov/Funding-Opportunities>.

Additionally, ESTCP Director Dr. Anne Andrews and Deputy Director Dr. Andrea Leeson will conduct a webinar, "ESTCP Funding Opportunities," on February 19, 2016, from 1:00-2:00 PM ET, to describe the new ESTCP funding opportunities. During the webinar, participants may ask questions about the funding process, the current ESTCP solicitation, and the proposal submission process. Preregistration is required.

SMALL BUSINESS VENDOR DAY HOSTED BY FEDERAL AVIATION ADMINISTRATION (FAA) CENTRAL SERVICE AREA SMALL BUSINESS DEVELOPMENT PROGRAM, KANSAS CITY, MO

Federal Aviation Administration (FAA), Greater Southwest Region, Ft. Worth, Texas.
Federal Business Opportunities, FBO-5088, Solicitation 23559, 2016

The Federal Aviation Administration's Central Service Area Small Business Development Program will host a Small Business Vendor Day on Wednesday, March 30, 2016, from 9:00 AM to 12:00 PM in the Heartland Auditorium of the FAA Central Regional Office at 901 Locust, Kansas City, MO. Attendance is limited to the first 25 small businesses that respond by 4:00 PM on February 26, 2016. Only small businesses registered in the System for Award Management in one of the 15 NAICS codes identified in the FedBizOpps notice (e.g., 541620: Environmental Consulting Services, and 562910: Remediation Services) are invited to attend. There is no cost to attend this event, but preregistration is required. <https://www.faa.gov/csp/DOT/FAA/SWB/23559/Listing.html>

SUPERFUND ARCHITECT & ENGINEERING ENVIRONMENTAL SUPPORT

Federal Aviation Administration (FAA), Atlantic City, NJ.
Federal Business Opportunities, FBO-5085, Solicitation DTFAC15-R-00025, 2016

Under a Federal Facilities Agreement with EPA, the FAA's William J. Hughes Technical Center at the Atlantic City Airport, NJ, has a continuing requirement for Environmental A-E services for remedial investigations, feasibility studies, remedial designs, and related compliance actions in over 30 areas of concern. Contaminants present in the soil, groundwater, surface water, and biota at this NPL-listed federal facility include chlorinated solvents, aviation and other fuels, pesticides, PCBs, heavy metals, and various species of mercury. Unexploded ordnance was discovered in two areas. A fixed-price 10IQ-type contract is anticipated for a period of performance of 10 years from date of award. This procurement will be a full and open competition under NAICS code 541620. This Screening Information Request may be considered a Request for Offer, and an awarded contract may result from proposals submitted in response to this announcement. Responses are due by 4:00 PM ET on March 2, 2016. <https://www.faa.gov/csp/DOT/FAA/WJH/DTFAC15-R-00025/Listing.html>

BROAD AGENCY ANNOUNCEMENT FOR INNOVATIVE TECHNOLOGIES AND METHODOLOGIES FOR REDUCING VARIOUS ENVIRONMENTAL PROBLEMS

Department of the Air Force, AFICA - CONUS, AFCEC/CZ, JBSA Lackland AFB, Texas.
Federal Business Opportunities, FBO-5087, Solicitation AFCECBA-16-001, 2016

The Air Force Civil Engineer Center, Environmental Management Directorate, seeks proposals that demonstrate and validate innovative, sustainable, and cost-effective technologies and methodologies for environmental restoration and compliance concerns. The requirement is not to test theoretical concepts or technologies already validated in the field (i.e., a service). The following topics are current areas of need for Restoration:

- Analytical method for perfluoroalkyl compounds (PFCS) in water, sediment, and/or biota.
- PFC remediation treatment train technologies for groundwater and soil.
- Integrated characterization and remediation of DNAPL at Air Force Plant 4.
- Cost-efficient characterization technology for large plume arrival front at Edwards AFB.
- Remediating metals and pesticides at Avon Park Air Force Range.

This notice also lists areas of need for Compliance topics. This requirement is restricted to U.S. companies, academic institutions, nonprofit institutions, and/or government agencies. The two-step process for proposal submittals calls for initial submittal of a Phase I BAA PDF form to afcecr-czr.ba@us.af.mil and then, if invited, Phase II submittal of a fully detailed proposal. Phase I submittals must be received by 4:00 PM CT on March 2, 2016. <https://www.fbo.gov/ntices/rd6271d09b748d3c317e7c1352768e>

ANNUAL BROAD AGENCY ANNOUNCEMENT (BAA): FY16 ENVIRONMENTAL INITIATIVES FOR NAVFAC EXWC

Naval Facilities Engineering Command, NAVFAC EXWC, Port Hueneme, CA.
Federal Business Opportunities, FBO-5094, Solicitation N3943016R7201, 2016

This announcement seeks technologies and methodologies to reduce environmental impacts from current and past Navy operations in the following areas: (1) environmental assessment, restoration, and cleanup; (2) conservation of natural resources; (3) detection, location, de-energizing, disposal, or remediation of unexploded ordnance; (4) pollution prevention; (5) environmental compliance; and (6) sustainability and climate change. This BAA is open for one year from the date of publication. This announcement is for abstracts/white papers only, which can be submitted using the abstract form and instructions provided by NEXWC. [Note: The URL for the instructions and submittal form given in the FedBizOpps notice returned an error message at the time of this posting.] Awards will be in the form of contracts. As no funding for contracts has been reserved in advance, NEXWC will be sharing qualified abstracts with other federal government activities to seek demonstration sites and/or funding. <https://www.fbo.gov/ntices/rd6146368c1811d4120a3e6b7a634>

Cleanup News

COMPARING VAPOR INTRUSION MITIGATION SYSTEM PERFORMANCE FOR VOCS AND RADON

Lutes, C. C., R.S. Truesdell, B.W. Hill, H. Zimmerman, and B.A. Schumacher.
Remediation Journal, Vol 25 No 4, 7-26, 2015

This paper summarizes a long-term study of vapor intrusion mitigation system performance in a historic, unoccupied residential duplex with an extensive set of temporal variability observations. The project design included multiple cycles of subslab depressurization (SSD) system operation and shut-off during a 7-month period, followed by a year-long period of continuous operation. Results showed that the system provided rapid pressure field extension and radon control as much as 100 days of operation before achieving optimum VOC mitigation. Greater variability in VOC concentrations than in radon concentrations was observed during the initial mitigation system cycling. Subslab VOC concentrations at numerous locations increased during this initial period of SSD operation, and indoor air VOC concentrations were more variable than radon. Indoor air concentrations were considerably less variable (and lower), however, during the first year of continuous SSD system operation.

LONGEVITY ESTIMATES FOR A PERMEABLE REACTIVE BARRIER SYSTEM REMEDIATING A 90SR PLUME

Hoppe, J., D. Lee, S.W. Jeon, and D. Blowes.
Uranium: Past and Future Challenges. Springer, ISBN: 978-3-319-11058-5 (Print), 537-544, 2015

A permeable reactive barrier—the wall and curtain system—was installed to intercept Sr-90 in the groundwater at the Chalk River Laboratories, Chalk River, Ontario, in 1998. The system employs clinoptilolite, a zeolite, as a reactive material to adsorb Sr-90. Reactive transport simulations of the site were conducted using the numerical code HydroGeoSphere to provide longevity estimates for the system. The HydroGeoSphere simulations included three solutes for which zoned distribution coefficients were specified. Longevity estimates derived from the simulation were between 70 and 100 years for the wall and curtain PRB. For additional information, see J. Hoppe's thesis at <http://www.cer.ca/theses/1017723/>

3D ELECTRICAL GEOPHYSICS INTEGRATED INTO GROUND CHARACTERISATION AND MONITORING INFORMS PERMEABLE REACTIVE BARRIER INSTALLATION AND BROWNFIELD SITE RE-DEVELOPMENT: CASE STUDY

Kulesa, B., R. Doherty, A. Revill, D. Mao, B. McPolin, and M. Larkin.
Geophysics for Critical Infrastructure, 16 July 2015, Keyworth, Nottingham, UK: Abstracts.

Investigators integrated 3D electrical resistivity tomography (ERT), 3D self-potential (SP) tomography, and SP monitoring with traditional borehole and trial pit measurements as well as contaminant hydrogeological modeling to develop an integrated model of complex subsurface pollution and aquifer stratigraphy at a former manufactured gas plant in Portadown, Northern Ireland. The ground model facilitated successful installation and operation of a biological permeable reactive barrier (PRB) along with a slurry containment wall. Ongoing SP monitoring demonstrated that microbial activity outside the PRB is significantly attenuating the complex contaminant plume. The integration of state-of-the-practice electrical geophysical methods enhanced the ground model and supported risk-based management and redevelopment of the brownfield site.

USE OF ANAEROBIC REDUCTIVE DECHLORINATION AND CEMENT/FERROUS IRON SYSTEM FOR THE REMEDIATION OF CHLORINATED VOCS

Scalzi, M. and A. Kucuk.
Third International Symposium on Bioremediation and Sustainable Remediation Technologies, 18-21 May 2015, Miami, Florida. Battelle Press, 23 slides, 2015

Anaerobic reductive dechlorination in the presence of a cement/ferrous iron system was undertaken to address chlorinated solvents in soil and groundwater at a site in Indianapolis, Indiana. After backfilling an excavation at the site with demolition debris (crushed brick and cement), contractors installed a monitoring well in the middle of the area. The objective of the remedial design was to accelerate in situ dechlorination via both abiotic and microbial processes. The remedial program was designed to mitigate off-site migration, treat sorbed and dissolved contamination, and create subsurface conditions conducive to biological reductive dechlorination through pH control, addition of organic hydrogen donors, and vitamin and nutrient supplements. The injected remedial mixture was very effective in decreasing the COC concentrations, achieving decreases in TCE, cis-1,2-DCE, and VC concentrations by 93%, 97%, and 92%, respectively. Based on the groundwater field parameters, however, most notably pH values of ~11.88 pH units, biologically based reductive dechlorination conditions do not appear to be favorable. It is assumed that the decreases in CVOC concentrations were significantly affected by the presence of cement in the area combined with the injected iron. <http://www.enrbioremediation.com/userdata/userfiles/files/RE%202015/Presentation%20DE%20-%2017%20Sept-202B-930am-Scalzi-11Use-Anaerobic-Reductive-Presentation-RE3-2015.pdf>

THE HIDDEN POTENTIAL OF MASS-BASED TREATMENT: A METHOD FOR PREVENTING REBOUND

Ranker, S.E.
Remediation Journal, Vol 25 No 4, 99-109, 2015

At a 0.73-acre site in New York City occupied for 60 yr by a manufacturer of roofing materials, releases of coal tar were left after waterproofing left an estimated 47,000 lb of residual coal tar NAPL in site soil and groundwater. The soils contained strata composed of sands, silty sands, and silty clay. A single in situ chemical oxidation treatment injected using Pressure Pulse Technology® targeted the contaminant mass and delivered alkaline-activated sodium persulfate to the NAPL at the pore-scale level. The RemMetrik® process was employed to quantify subsurface contamination, optimize the treatment, and measure its effectiveness. Subsequent soil sampling demonstrated contaminant mass reductions over 90%. Mass flux analysis three years following treatment shows sustained reductions in BTEX and naphthalene and no rebound. See also <http://www.rester.com/News/Articles/199AFC-Unique-Frontline-Steps-From-Ready-for-Development-136303> and <http://www.watpress.com/Science/Articles/51913/51913-5111.pdf> and <http://www.enrbioremediation.com/userdata/userfiles/files/RE%202015/Presentation%20DE%20-%2017%20Sept-202B-930am-Scalzi-11Use-Anaerobic-Reductive-Presentation-RE3-2015.pdf>

Demonstrations / Feasibility Studies

A PERMEABLE REACTIVE BARRIER (PRB) MEDIA SEQUENCE FOR THE REMEDIATION OF HEAVY METAL AND HYDROCARBON CONTAMINATED WATER: A FIELD ASSESSMENT AT CASEY STATION, ANTARCTICA

Statham, T.M., S.C. Stark, I. Snape, G.W. Stevens, and K.A. Mumford.
Chemosphere, Vol 147, 368-375, 2016

A field trial was conducted at Casey Station, Antarctica, to assess the suitability of a permeable reactive barrier (PRB) media sequence for the remediation of sites containing both hydrocarbon and heavy metal contamination. An existing PRB was modified to assess a media sequence consisting of three sections: (1) nutrient release/hydrocarbon sorption using ZeoPro™ (a zeolite-based fertilizer) and granular activated carbon; (2) phosphorus and heavy metal capture by granular iron and sand; and (3) nutrient and excess iron capture by zeolite. Phosphorus concentrations were reduced during flow through the iron/sand section and iron concentrations were reduced within the zeolite section; however, non-ideal flow was detected during a tracer test and supported by analysis of media and liquid samples from the second summer of operation. Results indicate that the pilot PRB media sequence might be appropriate for other locations, especially less environmentally challenging contaminated sites. See additional discussion of the project in Chapter 7 of T. Statham's Ph.D. thesis at <http://monoceres-access.uinmelb.edu.au/bitstream/handle/13633/5111>

SOURCE REPORT D: NATURAL SOURCE ZONE DEPLETION (NSZD) PILOT TEST MEMOS

Kulkarni, P., C. Newell, J. Zimbron, M. Himmelstein, F. Chamran, J. Lu, D. Buckley, and F. Muramoto.
Western States Petroleum Association, Torrance, CA, 40 pp, 2015

Carbon dioxide is the product of hydrocarbon degradation; thus, CO₂ generation above background levels provides direct evidence of the biodegradation of hydrocarbons and is part of a quantitative assessment of natural source-zone depletion (NSZD). The LA LNAPL Workgroup, working with Colorado State University, measured the "gas flux out" to investigate the evidence for NSZD at two sites. The investigators deployed carbon traps at the Shell Carson facility (memo begins on p. 5) and the Tesoro East Hynes facility (memo begins on p. 28) to estimate the carbon flux at the soil surface and, by extension, estimate the rates of hydrocarbon biodegradation at each site. Rather than collecting a CO₂ profile in the vadose zone, the investigators used a new technique, with the soil surface as a horizontal reference point. Each case study discusses the lines of evidence supporting the use of carbon traps to estimate biodegradation rates and the carbon trap pilot test results. <http://gsi-net.com/en/publications/la-lnapl-recoverability-study/source-report-c-surfactant-2.html>

Research

REVEGETATION AND BIOREMEDIATION TRIALS ON THE DUBLIN GULCH PROPERTY, 2012 TO 2014

Yukon Government - Energy, Mines & Resources, 58 pp, 2015

Revegetation research in support of reclamation planning for the Eagle Gold Project is underway at the Dublin Gulch Property to test the viability of incorporating biochar and other soil amendments into the site with a goal of creating an ultimate reclamation and revegetation plan. The project covers an area of ~650 km² in central Yukon and lies wholly within the traditional territory of the First Nation of the Na Cho Nyak Dun. In 2012, two sites—an exploration trench (pH 5.15) and a waste rock dump (pH 2.62)—were selected for the revegetation trials along with native acid-tolerant plant species. Biochar, compost, Leonardite, and dolomite (a buffering component) were used in a variety of combinations and proportions as amendments in the test plots alongside unamended controls. By 2014, the healthiest plots with highest species richness generally were those treated with biochar and compost only. http://www.em.gov.yk.ca/mining/nfmi/nfi/2014_annual_report.pdf

FIELD DEPLOYABLE CHEMICAL REDOX PROBE FOR QUANTITATIVE CHARACTERIZATION OF CARBOXYMETHYLCELLULOSE MODIFIED NANO ZEROVALENT IRON

Fan, D., S. Chen, R.L. Johnson, and P.G. Tratnyek
Environmental Science & Technology, Vol 49 No 17, 10589-10597, 2015

Nanoscale zero-valent iron synthesized with carboxymethylcellulose (CMC-NZVI) is among the leading formulations of NZVI currently used for in situ groundwater remediation. The main advantage of CMC-NZVI is that it forms stable suspensions that are relatively mobile in porous media; however, the fate of the CMC-NZVI (including "aging" and "reductant demand") is not well characterized. Improved understanding of CMC-NZVI fate requires methods with greater specificity for Fe(0), less vulnerability to sampling/recovery artifacts, and more practical application in the field. These criteria can be met with a simple and specific colorimetric approach using indigo-5,5'-disulfonate (I2S) as a chemical redox probe. Using the I2S assay to quantify changes in the Fe(0) content of CMC-NZVI, the rate of Fe(0) oxidation by water was found to be orders of magnitude faster than previously reported values for other types of NZVI. *This paper is Open Access* at <http://pubs.acs.org/doi/10.1021/acs.est.5b02804>.

COMBINATION OF SURFACTANT ENHANCED SOIL WASHING AND ELECTRO-FENTON PROCESS FOR THE TREATMENT OF SOILS CONTAMINATED BY PETROLEUM HYDROCARBONS

Huguenot, D., E. Mousset, E.D. van Hullebusch, and M.A. Oturan
Journal of Environmental Management, Vol 153, 40-47, 2015

An innovative combination of ex situ soil washing with electro-Fenton (EF) (an electrochemical advanced oxidation process) was tested on diesel-contaminated soil. The washing solution was enriched with surfactant Tween 80 at different concentrations higher than the critical micellar concentration (CMC). The impact of soil washing was evaluated on the hydrocarbon concentrations in the collected leachates, which then were studied for their degradation potential by EF treatment. A concentration of 5% of Tween 80 was required to extract hydrocarbons from the soil, but even at 5% concentration, treatment efficiency remained very low (only 1% after 24 h of washing). Subsequent EF treatments performed on the collected eluates revealed that quasi-complete mineralization (>99.5%) of the hydrocarbons was achieved within 32 h according to a linear kinetic trend; however, toxicity was higher than in the initial solution and reached 95% of inhibition of *Vibrio fischeri* bacteria measured by Microtox method, demonstrating the presence of remaining toxic compounds even after complete degradation. Biodegradability (BOD₅/COD ratio) reached a maximum of 20% after 20 h of EF treatment, which was insufficient to implement the combined treatment with a biological treatment process. *Additional work on the use of these combined techniques is described in E. Mousset's Ph.D. thesis at* <http://www.theses.fr/2013PESC1130.pdf>.

REMEDIALATION OF PAH-CONTAMINATED SOIL AT A GAS MANUFACTURING PLANT BY A COMBINED TWO-PHASE PARTITION SYSTEM WASHING AND MICROBIAL DEGRADATION PROCESS

Gong, X., X. Xu, Z. Gong, X. Li, C. Jia, M. Guo, and H. Li
Environmental Science & Pollution Research, Vol 22 No 16, 12001-12010, 2015

A remediation technique was designed using both soil washing and microbial degradation to remove PAHs from contaminated soil. Separate evaluations of (1) PAH biodegradation by inoculation of *Mycobacterium* sp. and (2) washing agent effectiveness (Tween 80 solution and biodiesel) in a 2-phase partition system (TPPS) was followed by (3) a study of TPPS washing combined with microbial degradation. Only phenanthrene and anthracene were noticeably biodegradable when the soil was simply inoculated with *Mycobacterium* sp. TPPS containing 2% (v/v) biodiesel and 2.5% (w/v) Tween 80 was used as the washing agent for the joint remediation test because it gave higher PAH extraction than Tween 80 solution at lower doses, with less residue in the soil. Joint TPPS washing and microbial degradation achieved total PAHs removal of 92.6%, which was much higher than either biodegradation or washing alone. The joint treatment improved removals of all high-molecular-weight PAHs, and bioavailable concentrations of all PAHs fell significantly after joint treatment.

TOTAL REDUCING CAPACITY IN AQUIFER MINERALS AND SEDIMENTS: QUANTIFYING THE POTENTIAL TO ATTENUATE CR(VI) IN GROUNDWATER

Sisman, S.L.
SRNL-STI-2015-00358, 14 pp, 2015

The objective of this investigation was to quantify potential natural attenuation, or reduction capacity, of reactive minerals and aquifer sediments. Samples of reduced-iron containing minerals such as ilmenite, as well as Puye Formation sediments representing a contaminated aquifer in New Mexico, were reacted with chromate. The change in Cr(VI) during the reaction was used to calculate reduction capacity. Results showed that minerals that contain reduced iron, such as ilmenite, have high reducing capacities. The data indicated that sample history may impact reduction capacity tests due to surface passivation. <http://www.gsti.gov/ser/vists/nfmi/12043634>.

PERMEABLE REACTIVE BARRIER REJUVENATION BY ALKALINE WASTEWATER

Banasik, L.J., B. Indraratna, G. Lugg, U. Pathirage, G. McIntosh, and N. Rendell
Environmental Geotechnics, Vol 2 No 1, 45-55, 2015

Chemical armoring of recycled concrete in a permeable reactive barrier (PRB) used to neutralize acidic groundwater significantly decreases its acid neutralizing capacity (ANC) by ~50% compared with its theoretical potential. In a long-term test to assess the reconditioning of armored recycled concrete aggregates with alkaline wastewater, the benefits of alkaline wastewater injection included sharp but short enhancement of the recycled concrete's ANC, as indicated by an increase in effluent pH and alkalinity and a reduction in oxidation reduction potential. Although the alkaline wastewater did not reduce chemical armoring significantly, it helped to liberate lodged mineral precipitates between concrete aggregates, thus less residue in the soil. Joint TPPS washing and microbial degradation achieved total PAHs removal of 92.6%, which was much higher than either biodegradation or washing alone. The joint treatment improved removals of all high-molecular-weight PAHs, and bioavailable concentrations of all PAHs fell significantly after joint treatment.

EVALUATION OF A HORIZONTAL PERMEABLE REACTIVE BARRIER FOR PREVENTING UPWARD DIFFUSION OF VOLATILE ORGANIC COMPOUNDS THROUGH THE UNSATURATED ZONE

Mahmoodlu, M.G., S.M. Hassanizadeh, N. Hartog, A. Raouf, and M.T. van Genuchten
Journal of Environmental Management, Vol 163, 204-213, 2015

Lab experiments were carried out to investigate the ability of a horizontal permeable reactive barrier (HPRB) containing solid potassium permanganate to oxidize TCE, toluene, and ethanol vapors migrating upward from a contaminated saturated zone. An increase in initial water saturation and HPRB thickness strongly influenced HPRB removal efficiency. Installing the HPRB relatively close to the water table was more effective due to the high background water content and enhanced diffusion of protons and/or hydroxides away from the HPRB. Inserting the HPRB far above the water table caused rapid changes in pH within the HPRB, leading to lower oxidation rates. <http://www.nielsbartog.nl/cpout/request.php?id=106>. See also M.G. Mahmoodlu's Ph.D. thesis at <http://dspace.library.uu.nl:8080/handle/1874/308471>.

FIELD TEST OF ENHANCED REMEDIAL AMENDMENT DELIVERY USING A SHEAR-THINNING FLUID

Truex, M.J., V.R. Vermeul, D. Adamson, et al.
Groundwater Monitoring & Remediation, Vol 35 No 3, 34-45, 2015

A field test was conducted to compare data from successive injection of a tracer in water followed by injection of a tracer in a shear-thinning fluid (STF) to evaluate the impact of the STF on tracer distribution uniformity in the presence of permeability contrasts within the targeted injection zone. Data from tracer breakthrough at multiple depth-discrete monitoring intervals and electrical resistivity tomography (ERT) showed that inclusion of STF in the injection solution improved the distribution of the injected fluid within the targeted treatment zone by (1) a reduction in the movement of injected fluids through high-permeability pathways, as evidenced by slower breakthrough of tracer at monitoring locations where breakthrough in baseline tracer-only injection data was faster; (2) faster arrival and to a greater extent in monitoring locations within low-permeability zones; and (3) a higher percentage of ERT 2-D cross section coverage within the injection interval between the injection well and a monitoring well about 3 m away. http://www.scitemps.edu/13818879/Field_Test_of_Enhanced_Remedial_Amendments_Delivery_Using_a_Shear-Thinning_Fluid

EVALUATING CONTAMINANT FLUX FROM THE VADOSE ZONE TO THE GROUNDWATER IN THE HANFORD CENTRAL PLATEAU: SX TANK FARMS CASE STUDY

Truex, M.J., M. Ostrom, G.V. Last, C.E. Strickland, and G.D. Tartakovsky
PNNL-23737, 168 pp, 2015

At DOE's Hanford facility, much of the contamination discharged to the subsurface through engineered waste sites and released from leaking waste storage tanks is still present within the unsaturated vadose zone sediments. In general, contaminant transport is slow through the vadose zone, and it is difficult to directly measure contaminant flux therein. Predictive analysis, supported by site characterization and monitoring data, was applied to the SX Tank Farm using a structured, systems-based approach to estimate the future contaminant flux to groundwater in support of remediation decisions for the vadose zone and groundwater. The SX Tank Farm was used for the case study because of the existing contaminant inventory in the vadose zone, observations of elevated moisture content in portions of the vadose zone, presence of a limited-extent groundwater plume, and the relatively large amount and wide variety of data available for the site. <http://www.gsti.gov/scitech/biblio/1724517>.

SLOW RELEASE PERSULFATE & MULTIOX CYLINDERS FOR PASSIVE, LONG-TERM TREATMENT OF PETROLEUM HYDROCARBON CONTAMINATED SITES

Para 3
BEST 2015: Bettering Environmental Stewardship and Technology, 32 slides, 2015

In situ chemical oxidation using permanganate, unactivated persulfate, or combinations of permanganate and persulfate has been implemented successfully as a treatment technology for the remediation of petroleum hydrocarbons and BTEX compounds. Persulfate SR (Slow Release) ISCO reagent and MultiOx™ SR ISCO reagent cylinders offer novel remedial approaches that have small footprint, do not require the injection of liquids, and minimize site disruption. This presentation describes the characteristics and mechanisms of these innovative technologies. http://www.bestconference.net/uploads/4/6/0/5/4605394/para_3para.pdf.

ARSENIC RELEASE FROM DECHLORINATION REMEDIATION PROCESSES OF BIOSTIMULATION AND BIOAUGMENTATION

Smith, Suzy, Master's thesis, Utah State University, Logan, UT. Paper 4438, 101 pp, 2015

Two studies were designed to evaluate the effect of different carbon sources on the removal of TCE through dechlorination and on As solubilization and mobilization in response to carbon addition. In the first study, TCE-contaminated aquifer solids collected near Hill Air Force Base, Utah, were given when Newman Zone® standard surfactant emulsified oil, Newman Zone® nonionic surfactant emulsified oil, and no-carbon controls as carbon and energy sources for 7.5 years. In the second study, systems-based approach to estimate the future contaminant flux to groundwater in support of remediation decisions for the vadose zone and groundwater. The SX Tank Farm was used for the case study because of the existing contaminant inventory in the vadose zone, observations of elevated moisture content in portions of the vadose zone, presence of a limited-extent groundwater plume, and the relatively large amount and wide variety of data available for the site. <http://digitalcommons.usu.edu/etd/4438/>.

SPATIAL DISTRIBUTION OF AN URANIUM-RESPIRING BETAPROTEOBACTERIUM AT THE RIFLE, CO FIELD RESEARCH SITE

Korbanics, N.M., S.J. Tuorto, and N. Lopez-Gamffarelli, et al.
OCS One, Vol 10 No 4, Paper #0123737, 2015

DOE's Integrated Field-Scale Subsurface Research Challenge Site (IFRC) at Rifle, Colorado, was created to address the gaps in knowledge on the mechanisms and rates of U(VI) bioreduction in alluvial sediments. Previous studies at the Rifle IFRC have linked microbial processes to U immobilization during acetate amendment, but most of the evidence implicating U reduction with specific microbiota has been indirect. This paper reports the cultivation of a microorganism from the Rifle IFRC that reduces U and appears to utilize it as a terminal electron acceptor for respiration with acetate as electron donor. The bacterium constitutes a significant proportion of the subsurface sediment community prior to biostimulation (based on TRFLP profiling of 16S rRNA genes), occurs commonly in alluvial sediments located between 3-6 m bgs at Rifle, and may play a role in initial U reduction at the site. *This paper is Open Access* at <http://journal.eos.org/eoscom/article/doi/10.1371/journal.pone.0123378>.

INFLUENCE OF CARBON AND MICROBIAL COMMUNITY PRIMING ON THE ATTENUATION OF URANIUM IN A CONTAMINATED FLOODPLAIN AQUIFER

Mouser, P.J., A.L. N'Guegan, and N. Qafoku, et al.
Groundwater, Vol 53 No 4, 600-613, 2015

Sediments enriched in natural organic matter are capable of sequestering significant quantities of U, but may also serve as sources to the aquifer, contributing to plume persistence. Two types of sediments were compared to better understand the mechanisms contributing to the sequestration and release of U in the presence of organic matter. Artificially bioreduced sediments were retrieved from a field experimental plot previously stimulated with acetate, while naturally bioreduced sediments were from a location enriched in organic matter but never subject to acetate amendment. Batch incubations demonstrated that the artificially bioreduced sediments were primed to rapidly remove U from the groundwater, whereas naturally bioreduced sediments initially released a sizeable portion of sediment U before U(VI) removal commenced. Results highlight the importance of characterizing zones with heterogeneous carbon pools at U-contaminated sites prior to the determination of a remedial strategy.

General News

SCREENING OF THE BACTERIAL REDUCTIVE DECHLORINATION POTENTIAL OF CHLORINATED ETHENES IN CONTAMINATED AQUIFERS

Tarnawski, S.-E., P. Rossi, and C. Halliger
Swiss Federal Office for Environment - FOEN (OFEV), 86 pp, 2015

In this technical manual for assessment of natural attenuation of chloroethene-contaminated sites, the objective is to offer a practical solution for anyone wishing to examine the remediation process (natural or enhanced) in detail. A step-by-step screening tool is presented for an evaluation of site status and an examination of the presence or absence of contaminant natural attenuation. The document presents a procedure based on a multivariate statistical tool dedicated to the analysis of data provided by geological, chemical, and biological analyses. In this sense, the aquifer ecosystem functioning is examined as a whole. The statistical analysis looks for the best correlations between different data sets and depicts the statistical significant variables. A conceptual model of aquifer functioning with respect to degradation of chlorinated ethenes is deduced from the analysis. Interpretation of the model then illuminates the reasons for issues such as observed stalling of lower chlorinated ethenes and proposes a corrective strategy. The final chapter offers several case studies. <http://infocentre.epfl.ch/infocentre/article/doi/10.1371/journal.pone.0220115.pdf>

CLEANUP 2015 CONFERENCE, MELBOURNE, AUSTRALIA, 13-16 SEPTEMBER 2015

Cooperative Research Centre for Contamination Assessment and Remediation of the Environment (CRC CARE), 632 pp, 2015

Every two years, scientists, engineers, regulators, and other environmental professionals representing universities, government (site management and regulatory agencies), and R&D and manufacturing firms from more than 20 countries gather for the diverse program presented at this event. The final program and proceedings for Cleanup 2015, including an overview of the conference workshops, short courses, sessions, and symposiums, can be downloaded at <http://www.crccare.com/cleanup-conference/cleanup-2015/program>.

BIOREMEDIATION AND BIOECONOMY

Korstad, M.N.V., (ed)
Elsevier, New York, ISBN: 9780128028308, 730 pp, 2016

This text aims to provide a common platform for scientists from various backgrounds to find sustainable solutions to environmental issues, including the increasing degradation of water resources due to urbanization, environmental contamination, increasing populations, and global economic development. Bioremediation is emerging as a valuable tool for environmental cleanup. This book presents innovative and cost-effective solutions to decontaminate impaired environments while using contaminated land and wastewater for the development of products, such as biocomposites and fuels. *See the table of contents and chapter abstracts at*

<http://www.sciencedirect.com/science/book/9780128028308>

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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