Technology Innovation News Survey

Entries for March 1-15, 2014

Market/Commercialization Information

INDUSTRY DAY ANNOUNCEMENT: AIR FORCE CIVIL ENGINEERING CENTER

Air Force Installation Contracting, Wright Patterson AFB, OH.
Federal Business Opportunities, FBO-4521, Solicitation FA8051-14-R-9999, 2014

The next Industry Day Forum will take place May 6, 2014, 8:45 am - 4:30 pm, at the Bay Point Wyndham Hotel, 4114 Jan Cooley Dr, Panama City Beach, Florida 32408. This forum will provide industry partners an avenue to learn about AFCEC's mission across the Air Force enterprise and about potential opportunities in FY14 and beyond in all seven AFCEC Directorates: Environmental, Operations, Facility Engineering, Readiness, Installations, Energy, and Planning & Integration.
https://www.fbo.gov/notices/549c9e5ef9945a0d62d57c9307fef90a

WHITMORE ABANDONED MINE LAND REMEDIATION

Department of the Interior, Bureau of Land Management, California Region, Sacramento, CA.
Federal Business Opportunities, FBO-4501, Solicitation L14PS00273, 2014

The Bureau of Land Management, Palm Springs Field Office, anticipates acquiring contractor services to provide all personnel, equipment, tools, materials, supervision, and other items necessary to perform abandoned mine land remediation in Eastern Riverside County, California. The request for quotes (RFQ) is set aside for small business under NAICS code 562910, with a size standard of 500 employees. Award will result in a 1-year firm-fixed-price contract. Use the search interface at https://www.fedconnect.net to locate the full text of this procurement. The RFQ closing date is 5:00 pm PDT, May 5, 2014.

LEADVILLE MINE DRAINAGE TUNNEL GROUND WATER REMEDIATION

Department of the Interior, Bureau of Reclamation, Great Plains Regional Office, Billings, MT.
Federal Business Opportunities, FBO-4509, Solicitation R14PS00303, 2014

The Leadville Mine drainage water treatment plant generates metal hydroxide sludge as a result of groundwater remediation chemical-physical treatment processes. The sludge must be temporarily stored, transported, and disposed of at a state-certified landfill engineered for industrial waste streams. The contract term runs from June 1, 2014, through May 31, 2015, with four option periods. The Leadville groundwater remediation, NAICS code 562910, is a total small business set-aside. Responses are due by 5:00 pm, April 30, 2014. The details of this procurement are available only through the search interface at https://www.fedconnect.net.

SOURCES SOUGHT SYNOPSIS: REQUEST FOR INFORMATION

U.S. Department of Energy, EM Consolidated Business Center, Cincinnati, OH.
Federal Business Opportunities, FBO-4506, Solicitation DE-SOL-0006499, 2014

DOE's Office of Environmental Management is planning a follow-on procurement for specialized treatment of waste derived from operational processes and remediation activities. The current contract expires in June 2015. DOE requires the treatment of radioactive waste for final compliant disposition of liquid, solid, and gaseous low-level waste and mixed low-level waste, including high-gram quantities that might also contain PCBs; beryllium; petroleum, oils, and lubricants; asbestos; and hazardous gases. The NAICS code for this requirement is 562211, with a size standard of $35.5M (annual receipts). All information relating to this notice must be accessed through the search interface at https://www.fedconnect.net/A capability statement of no more than 20 pages is due by April 28, 2014, 4:00 p.m. ET.

ENVIRONMENTAL SERVICES: PRESOLICITATION NOTICE

Other Defense Agencies, Washington Headquarters Services, Arlington, VA.
Federal Business Opportunities, FBO-4505, Solicitation WR0718131006, 2014

Washington Headquarters Services Acquisition Directorate will issue a solicitation to obtain environmental services for the National Capital Region, mainly at the Pentagon Reservation, Arlington, Virginia. Services include environmental assessments and analysis; spill reporting, investigation, and cleanup; environmental sampling; hazardous site evaluation; and other tasks under NAICS code 541620. This requirement will be 100% set-aside for small business with a size standard of $14 million. A single firm-fixed-price, indefinite-delivery, indefinite-quantity contract is anticipated for a 12-month base period with four 12-month options. RFP release is expected on or about April 21, 2014, with proposals due 30 days later. https://www.fbo.gov/spg/ODA/WHS/REF/WR0718131006/listing.html

SYNOPSIS FOR ENFORCEMENT AND TECHNICAL SUPPORT FOR OCE

U.S. EPA, Office of Acquisition Management, Washington, DC.
Federal Business Opportunities, FBO-4508, Solicitation SOL-DC-13-00031, 2014

EPA plans to issue up to two full-and-open competitive awards under NAICS code 541620 for technical, analytical, and enforcement support for EPA's Office of Enforcement and Compliance Assurance, Office of Civil Enforcement (OCE). OCE is charged with the development, litigation, and settlement of administrative and civil judicial cases against violators of environmental laws. The RFP and any amendments will be available around mid-April 2014 through the search interface at https://www.fedconnect.net/. Award of two 5-year, cost-reimbursement type contracts is anticipated, each for 50% of the total estimated 188,000 labor hours.
https://www.fbo.gov/spg/EPA/OAM/HQ/SOL-DC-13-00031/listing.html

SUPERFUND AE ENVIRONMENTAL PROFESSIONAL SERVICES SUPPORT SOURCES SOUGHT NOTICE

Department of Transportation, Federal Aviation Administration (FAA), Atlantic City, NJ.
Federal Business Opportunities, FBO-4516, Solicitation 16101, 2014

The FAA is seeking interest and capability statements from vendors able to provide Superfund environmental architect-engineer services for areas within the grounds and waters of the William J. Hughes Technical Center, Atlantic City International Airport, New Jersey. In 1993, EPA and FFA signed a federal facility agreement for conduct of site Superfund remediation activities. Tasks covered under the statement of work include environmental management and technical support (regulatory compliance, investigation, design) related to Superfund only. FAA desires a narrative statement (10 pages or less) of qualifications and capabilities for dealing with a requirement of this magnitude by 2 pm ET, April 29, 2014https://www.fbo.gov/spg/DOT/FAA/WJHTC/16101/listing.html

IDIQ CONTRACT FOR ENVIRONMENTAL REGULATORY SERVICES TO THE U.S. COAST GUARD FACILITIES DESIGN CONSTRUCTION CENTER (FDCC), DETACHMENT SEATTLE IN THE STATE OF ALASKA

Department of Homeland Security, United States Coast Guard (USCG), Seattle, WA.
Federal Business Opportunities, FBO-4516, Solicitation HSCG50-14-R-PXA701, 2014

The proposed contract is 100% set-aside for 8(a) small businesses under NAICS code 562910. The work consists of providing environmental remediation of regulated waste and/or hazardous waste sites and environmental facility management to the U.S. Coast Guard FDCC - Detachment Seattle, primarily in Kodiak, Alaska. The Government intends to award a single 5-year indefinite-delivery, indefinite-quantity contract, with a potential maximum contract total of $9.5 million. Although the RFP has not yet been issued, the anticipated response date is May 20, 2014, 2:00 pm PT.
https://www.fbo.gov/spg/DHS/USCG/USCGFDCCP/HSCG50-14-R-PXA701/listing.html

INDEFINITE DELIVERY ARCHITECT-ENGINEER SERVICES CONTRACT FOR FUDS HTRW, ALEUTIAN ISLANDS, ALASKA

U.S. Army Corps of Engineers (USACE), USACE District, Alaska, Elmendorf AFB, AK.
Federal Business Opportunities, FBO-4523, Solicitation W911KB-14-R-0041, 2014

USACE Alaska's Formerly Used Defense Site program covers investigation, planning, and design for cleanup of hazardous, toxic, and radiological wastes and other environmental contaminants at various locations in Alaska. USACE is conducting a market survey to determine the basis for a future procurement under NAICS code 541330, which has a size standard of $14,000,000 in average annual receipts. No solicitation will be issued at this time. Submittals in response to the sources-sought must be received via email no later than 4:00 pm Alaska time on April 28, 2014. One contract will be awarded as indefinite delivery with a contract limit of $10,000,000.00 over five years. Contract award is anticipated for 4th quarter FY14. https://www.fbo.gov/spg/USA/COE/DACA85/W911KB-14-R-0041/listing.html

ENVIRONMENTAL REMEDIATION SERVICES

Naval Facilities Engineering Command, NAVFAC Atlantic, Norfolk, VA.
Federal Business Opportunities, FBO-4522, Solicitation N6247014R9010, 2014

NAVFAC Atlantic is conducting market research to determine the availability and adequacy of potential qualified small business concerns interested in submitting a proposal as a prime contractor for environmental remediation services, NAICS code 562910. The government contemplates a multiple-award, cost-plus-award-fee, indefinite-delivery, indefinite-quantity remedial action contract (RAC) with an estimated ceiling of $240M for a base year and four 1-year option periods. The general scope of work is to provide remediation of contaminants identified and regulated under RCRA, CERCLA, TSCA, and SWDA, as well as petroleum oils and lubricants and ordnance explosives or unexploded ordnance. Interested firms should respond to the sources-sought capabilities questionnaire attached to the notice at FBO.gov by April 30, 2014.
https://www.fbo.gov/spg/DON/NAVFAC/N62470CON/N6247014R9010/listing.html

Cleanup News

INNOVATIVE TREATMENT OF CHLORINATED SOLVENTS USING IN SITU REDUCTIVE DECHLORINATION SYNERGISTIC TECHNOLOGIES

Karachalios, A. and M. Scalzi.
IPEC 2013: 20th Annual International Petroleum Environmental Conference, 12-14 November 2013, San Antonio, Texas. 5 pp, 2013

Synergistic remediation techniques were implemented to reduce the concentrations of drycleaning solvents (PCE and TCE) in soil and groundwater at a site located in Bedminster, New Jersey. Injections to enhance biological reductive dechlorination of the chlorinated VOCs were performed in conjunction with injections of micron-scale zero-valent iron (ZVI). The remedial design used a combination of injection techniques to administer a solution of nutrients; sodium sulfite; calcium propionate and soluble kelp; ZVI suspension; vitamins B-2 and B-12; EHC®; and liquid hydrogen release compound to promote conditions in the groundwater favorable to anaerobic bacteria. Following implementation in January and February 2011, CVOC concentrations decreased as much as 99%, with PCE and TCE declining below the laboratory detection limit and little to no daughter product formation.
http://ipec.utulsa.edu/Conf2013/Manuscripts_pdfs/TreatmentofChlorinatedSolvents.pdf

RCRA CORRECTIVE ACTION: CASE STUDIES REPORT

U.S. Environmental Protection Agency, Washington, DC.
EPA 530-R-13-002, 32 pp, Apr 2013

This report begins with an overview of the RCRA Corrective Action Program, including a discussion of the public health and environmental benefits of hazardous waste cleanups (Section I). Information on the number, location, size, and cleanup progress of corrective action facilities (Section II) is then followed by case studies that profile a series of ongoing cleanups (Section III). Together, their stories illustrate the challenges and benefits of RCRA Corrective Action.
http://www.epa.gov/epawaste/hazard/correctiveaction/pdfs/rcracorrective.pdf

USE OF INNOVATIVE SOIL VAPOR EXTRACTION SYSTEM FOR DELINEATION AND REMEDIATION OF VADOSE ZONE IMPACTED WITH CHLORINATED HYDROCARBONS

Dickson, J.R. and A. Lonergan.
IPEC 2013: 20th Annual International Petroleum Environmental Conference, 12-14 November 2013, San Antonio, Texas. 37 slides, 2013

After multiple soil investigations in a third-party manufacturing facility were unable to locate the source of chlorinated hydrocarbon soil contamination, a flexible soil vapor extraction (SVE) system was installed to delineate and remediate the impacted soils. The system is a container-mounted unit consisting of a variable frequency drive blower controlled by a programmable logic controller (PLC) with a Web-based telemetry system. The blower extracts vapors within a range of extraction rates through a knockout tank from a manifold attached to eight SVE wells install throughout the plant footprint. PLC-controlled solenoid valves actuate 1 to 8 pneumatic valves located at the well riser pipes before the manifold via individual air hoses attached to a small compressor. Measurements collected from monitoring points installed near key wells evaluate the radius of influence developed during the testing. Using an onsite gas chromatograph, wells can be characterized, step-tested, and optimized one at a time, and then set up to run individually or in banks. Using this process, the site was quickly characterized, and initial banks of wells were established by changing settings in the PLC. Active remediation operations were optimized and running as the characterization crew demobilized from the site.
http://ipec.utulsa.edu/Conf2013/Manuscripts_pdfs/Dickson.pdf

NON-EMULSIFIED VEGETABLE OIL BLEND FOR ENHANCED ANAEROBIC BIOREMEDIATION

Dugan, P.J. and J. Hesemann.
REMTECH 2013: The Remediation Technologies Symposium, Banff, AB, Canada, 20-22 Oct 2013. Environmental Services Association of Alberta, Edmonton, AB (Canada), 31 slides, 2013

CAP18® Anaerobic Bioremediation Product is a non-emulsified vegetable oil blend consisting of triacylglycerols that slowly hydrolize once injected into the subsurface, releasing volatile fatty acids (VFAs) and glycerol, which indigenous microbes act upon to provide for a long-term anaerobic bioremediation zone in the downgradient VFA plume formed after injection. In 2009, a CAP 18® enhanced anaerobic bioremediation treatment was performed in Manhattan, Kansas, at the former Cinderella Cleaners and Stickel Dry Cleaners facilities to address CVOC groundwater contamination near the source area and reduce downgradient migration of the contaminant plume. The injection strategy used direct-push technology and consisted of five injection curtains oriented perpendicular to the direction of groundwater flow: three curtains downgradient of the former Cinderella Cleaners and two curtains downgradient of the Stickel Dry Cleaners. Three years following application, concentration data indicate that substrate is still being released and that bioremediation activity is ongoing.
Slides: http://www.esaa-events.com/proceedings/remtech/2013/pdf/13-Dugan.pdf
Longer abstract: http://www.esaa-events.com/remtech2013/2013abstracts/Abstracts%2043.pdf

FORT HAMILTON ARMY DEFENSE ENVIRONMENTAL RESTORATION PROGRAM INSTALLATION ACTION PLAN, FY2013

U.S. Army Environmental Center, 20 pp, 2013

The Building 200 site, used as an Army-Air Force Exchange Services gas station, is still in operation. Subsurface BTEX contamination was discovered near the facility's gasoline underground storage tanks in FY98. Measurements taken at onsite monitoring wells showed the free-product plume to be up to 6 ft thick. Consultants estimated the presence of ~2,000 gallons of free product atop the water table at 30-ft depth, with indications that the contaminant plume covered an area ~100 ft by 75 ft, moving about 4 ft/yr. The contamination is located in the Brooklyn-Queens aquifer, a designated drinking water source; however, this particular area of the aquifer currently is not so used. An investigation and remediation pilot study indicated that the 9,750 ft^2 contaminated plume is confined. A dual-phase extraction remediation system was installed in 2008 and continues to operate. Numerous problems have been encountered and addressed. The current PBA contract takes the site to RIP/RC by 2017, when cleanup goals should be achieved, site remediation equipment removed, wells closed, and the site restored.
http://aec.army.mil/Portals/3/IAP/NY-Hamilton.pdf

REPORT OF THE UNITED STATES EMBASSY SCIENCE FELLOWS SUPPORT TO THE GOVERNMENT OF JAPAN, MINISTRY OF THE ENVIRONMENT: OBSERVATIONS AND COMMENTARY ON REMEDIATION OF THE LANDS OFF-SITE FROM THE FUKUSHIMA DAIICHI REACTORS

Lee, S.D., R.L. Sindelar, and M.B. Triplett.
EPA 600-R-13-135, SRNL-RP-2013-00303, 133 pp, 2013

The U.S. Department of State, in conjunction with DOE and EPA, sponsored three Embassy Science Fellows (ESFs) to provide expertise to support the Government of Japan's Ministry of the Environment in executing its charter to sponsor and oversee decontamination work off-site from the Fukushima Daiichi nuclear power plant. Chapter 1 of this report summarizes the extent of initial contamination, status of the decontamination activities, and program elements of an environmental remediation system for populated land contaminated with cesium. Chapters 2 through 8 describe the observations of the ESF team with respect to the environmental remediation program and offer both general and specific recommendations for improvements within the remediation program elements.
http://srnl.doe.gov/pubs/SRNL-RP-2013-00303_embassy-fellows-report.pdf

REMEDIATION OF A MERCURY-POLLUTED SOIL IN A FORMER NUCLEAR SITE

Potier, G., T. Varet, and G. de Laval.
ICEM 2013, Abstract ICEM2013-96244, 14 slides, 2013

The cleanup of a former light isotope manufacturing facility in an urban area involves remediation of ~100,000 cubic meters of soil and the decommissioning of facilities. Mercury is the primary waste at the site, but organic compounds and metals are also found. Thermal desorption, used to remove mercury from contaminated soil and concrete materials, represents more than half the project cost and is expected to require three to four years to complete. The desorbed mercury is condensed and recovered as liquid metal for reuse in electronics industries. The objective is to achieve a residual level of mercury of less than 1 ppm and less than 0.01 ppm leachate in the treated soils. The contaminated concrete blocks and rubble are given mechanical treatment and washing, organic compounds receive biological treatment, and the metal-contaminated soil is excavated and removed.
Slides: http://www.asmeconferences.org/ICEM2013/pdfs/96244.pdf
Additional information: http://www.wmsym.org/archives/2012/papers/12243.pdf

Demonstrations / Feasibility Studies

USE OF COMPOUND-SPECIFIC STABLE ISOTOPE ANALYSIS TO DISTINGUISH BETWEEN VAPOR INTRUSION AND INDOOR SOURCES OF VOCS

Beckley, L., T. McHugh, T. Kuder, and R.P. Philp.
ESTCP Project ER-201025, 414 pp, Nov 2013

This demonstration was conducted to validate use of compound-specific stable isotope analysis (CSIA) to distinguish between vapor intrusion and indoor sources of VOCs. As part of the project, a step-by-step protocol was developed that can be used to provide an independent line of evidence to determine whether or not buildings are affected by vapor intrusion.
http://www.serdp-estcp.org/content/download/24494/253482/file/ER-201025-FR.pdf

USE OF ON-SITE GC/MS ANALYSIS TO DISTINGUISH BETWEEN VAPOR INTRUSION AND INDOOR SOURCES OF VOCS

Beckley, L., T. McHugh, K. Gorder, E. Dettenmaier, and I. Rivera-Duarte.
ESTCP Project ER-201119, 507 pp, 2013

Rapid on-site analysis of indoor air samples using a portable GC/MS allows the user to understand the distribution of VOCs in real time, supporting identification of the source while in the field. The overall objective of the demonstration was to develop and validate a step-wise investigation procedure using

commercially available off-the-shelf on-site GC/MS analysis (a portable HAPSITE unit) with real-time decision-making as a tool to distinguish between vapor intrusion and indoor sources of VOCs. Results from concurrent conventional vapor intrusion and compound-specific stable isotope analysis investigations were compared with the GC/MS results to evaluate the relative effectiveness of the different investigation approaches.
http://www.serdp-estcp.org/content/download/24416/252911/file/ER-201119-FR.pdf

TREATMENT OF N-NITROSODIMETHYLAMINE (NDMA) IN GROUNDWATER USING A FLUIDIZED BED BIOREACTOR

Hatzinger, P. and T. Webster.
ESTCP Project ER-200829, 220 pp, 2014

The most effective treatment technology for NDMA in groundwater currently is pump-and-treat with ultraviolet (UV) irradiation, but the approach is expensive because it requires high energy input to reduce the levels of NDMA to meet regulatory requirements. ESTCP project ER-200829 demonstrated and validated the use of a propane-fed fluidized bed bioreactor (FBR) at NASA's White Sands Test Facility in Las Cruces, New Mexico, for ex situ treatment of NDMA from ppb (µg/L) influent concentrations to low ppt (ng/L) effluent concentrations. The pilot-scale FBR (1-5 gpm influent flow) was operated for ~1 year on the actual site water using coconut shell-based granular activated carbon media under various operating conditions. Propane, oxygen, and inorganic nutrients were fed to the system to support microbial growth and NDMA biodegradation. For a majority of the study, the pilot FBR treated water that had passed through the air stripper to remove VOCs, allowing direct cost and performance comparison with the existing UV system.
http://www.serdp-estcp.org/content/download/24415/252901/file/ER-200829-FR.pdf

Research

SOIL, PLANT, AND TERRAIN EFFECTS ON NATURAL PERCHLORATE DISTRIBUTION IN A DESERT LANDSCAPE

Andraski, B.J., W.A. Jackson, T.L. Welborn, J.K. Boehlke, R. Sevanthi, and D.A. Stonestrom.
Journal of Environmental Quality, [Open Access paper] 2014

Although perchlorate is found in rocket fuel and fertilizers, the compound also occurs naturally. Scientists from the U.S. Geological Survey and Texas Tech University quantified natural levels of perchlorate in desert soil, plants, and atmospheric materials and identified the factors that control its natural cycling and accumulation. These new findings quantify natural perchlorate background levels and provide basic data on perchlorate distribution and cycling that are pertinent to the assessment of environmental impacts in desert ecosystems and broadly transferable to anthropogenically contaminated systems.
https://dl.sciencesocieties.org/publications/jeq/articles/0/0/jeq2013.11.0453

MICRO-X-RAY FLUORESCENCE, MICRO-X-RAY ABSORPTION SPECTROSCOPY, AND MICRO-X-RAY DIFFRACTION INVESTIGATION OF LEAD SPECIATION AFTER THE ADDITION OF DIFFERENT PHOSPHORUS AMENDMENTS TO A SMELTER-CONTAMINATED SOIL

Baker, L.R., G.M. Pierzynski, G.M. Hettiarachchi, K.G. Scheckel, and M. Newville.
Journal of Environmental Quality, Vol 43 No 2, 488-497, 2014

Investigators used a combination of several synchrotron-based techniques (i.e., spatially resolved micro-X-ray fluorescence, micro-X-ray absorption near-edge structure spectroscopy, and micro-X-ray diffraction) to speciate Pb at two incubation times in a smelter-contaminated soil following addition of several fluid and granular P amendments. Results indicated that the Pb phosphate mineral plumbogummite was an intermediate phase of pyromorphite formation. Additionally, all fluid and granular P sources were able to induce Pb phosphate formation, but fluid phosphoric acid (PA) was the most effective with time and distance from the treatment. Granular phosphate rock and triple super phosphate (TSP) amendments reacted to generate Pb phosphate minerals, with TSP the more effective at greater distances from the point of application. Overall, PA and TSP were the most effective P amendments at inducing Pb phosphate formation.

MONITORING VADOSE ZONE DESICCATION WITH GEOPHYSICAL METHODS

Truex, M.J., T.C. Johnson, C.E. Strickland, J.E. Peterson, and S.S. Hubbard.
Vadose Zone Journal, Vol 12 No 2, 2013

Neutron moisture logging, cross-hole electrical resistivity tomography, and cross-hole ground-penetrating radar approaches were evaluated with respect to their ability to provide effective spatial and temporal monitoring of desiccation during a treatability study conducted in the vadose zone of DOE's Hanford facility. The treatability study was a field test of soil desiccation as a potential vadose zone remediation technology. Desiccation removes water from the vadose zone and significantly decreases the aqueous-phase permeability of the desiccated zone, thereby decreasing movement of

moisture and contaminants. The 2- and 3-D distribution of moisture content reduction with time provided valuable information for desiccation operations and for determining attainment of treatment goals. http://esd.lbl.gov/files/about/staff/susanhubbard/2012_-_Truex-Peterson-Hubbardvzj-v12-0147.pdf

CHARACTERIZATION AND REMEDIATION OF CHLORINATED VOLATILE ORGANIC CONTAMINANTS IN THE VADOSE ZONE

Brusseau, M.L., K.C. Carroll, M.J. Truex, and D.J. Becker.
Vadose Zone Journal, Vol 12 No 4, 1-17, 2013

Soil vapor extraction (SVE) operations typically exhibit reduced mass-removal effectiveness at some point due to the impact of poorly accessible contaminant mass and associated mass-transfer limitations. Assessment of SVE performance and closure currently is based on characterizing contaminant mass discharge associated with the vadose zone source and its impact on groundwater or vapor intrusion. This paper summarizes recent advances in understanding the transport, characterization, and remediation of chlorinated solvents in the vadose zone; the evolution of contaminant distribution with time and associated impacts on remediation efficiency; the potential impact of persistent sources on groundwater quality and vapor intrusion; and alternative methods for site characterization and remediation.

VAPOR-PHASE TRANSPORT OF TRICHLOROETHENE IN AN INTERMEDIATE-SCALE VADOSE-ZONE SYSTEM: RETENTION PROCESSES AND TRACER-BASED PREDICTION

Costanza-Robinson, M.S., R.D. Carlson, and M.L. Brusseau.
Journal of Contaminant Hydrology, Vol 145, 82-89, 2013

Gas-phase miscible-displacement experiments were conducted using a large weighing lysimeter to evaluate retention processes for VOCs in vadose zone systems and to test the utility of gas-phase tracers for predicting VOC retardation. TCE served as a model VOC, while trichlorofluoromethane and heptane were used as partitioning tracers to characterize TCE retention by water and the air-water interface, respectively. Retardation factors for TCE ranged between 1.9 and 3.5, depending on water content. Dissolution into the bulk water was the primary retention mechanism for TCE under all conditions studied, contributing about two-thirds of the total measured retention. Accumulation at the air-water interface comprised a significant fraction of the observed retention, with an average contribution of ~24%. Sorption to the solid phase contributed ~10% to retention. Retardation factors for TCE predicted using the partitioning-tracer data were in reasonable agreement with the measured values. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3650913/

MULTIPHASE EXTRACTION OF LIGHT NON-AQUEOUS PHASE LIQUID (LNAPL) USING PREFABRICATED VERTICAL WELLS

Gabr, M.A., N. Sharmin, and J.D. Quaranta.
Geotechnical and Geological Engineering, Vol 31 No 1, 103-118, 2013

This paper describes the results of a field and modeling study conducted to investigate the extraction of JP-4 jet fuel using prefabricated vertical wells (PVWs) at a former Air Force base. Field testing consisted of 185 operating hours on 25 rows, each containing 7 or 8 PVWs. Vacuum extraction removed a total of 133 L of free-phase liquid from the subsurface in addition to 467 kg of volatilized organics. Field monitoring data were used to calibrate a numerical model for investigating the effect of irreducible water, LNAPL, and gas content on system performance. Increasing the irreducible water content from 5% to 20% decreased the free-LNAPL specific volume from 0.08 m to 0.067 m, which reduced removal efficiency. Under a continuous saturation condition, more wetting fluid (water) traps the nonwetting fluid (LNAPL) in the soil pores and reduces its mobility, which eventually impedes LNAPL recovery. Given the model parameters that simulate field conditions, the PVWs show best removal rates in the gas phase. Model results indicated that 292 L of JP-4 can be recovered in 19.5 days (based on 8 hr/day operation) with an effective rate of 1.87 L/hr. At the end of 4.25 years of system operation, the maximum benzene concentration is 0.002 ppm. At a gas extraction rate of 10,273 L/min, a maximum concentration of 0.38 ppm in the vapor phase is achieved after 2.5 years of vapor extraction*Additional information on this work is available in N. Sharmin's Ph.D. dissertation at* http://repository.lib.ncsu.edu/ir/handle/1840.16/3727.

FIELD-SCALE MONITORING OF PHARMACEUTICAL COMPOUNDS APPLIED TO ACTIVE GOLF COURSES BY RECYCLED WATER

Young, M.H., R.L. Green, J.L. Conkle, M. McCullough, D.A. Devitt, L. Wright, B.J. Vanderford, and S.A. Snyder.
Journal of Environmental Quality, Vol 43 No 2, 658-670, 2014

During a 2-year field study, researchers assessed compound mass flux of 13 pharmaceuticals in the fairways of four golf courses in the southwestern United States. The sites varied by climate and soil type but followed similar turfgrass management programs. At least one pharmaceutical compound was found in nearly all samples collected, though concentrations were substantially lower after transport through the soil. Percent reduction in compound mass fluxes in drainage water was effectively 100% in 22 of 52 cases, 98-100% in 27 of 52 cases, and 73-94% in 3 of 52 cases of a specific compound measured at a specific site. For cases where the majority of the analyses were reportable, all fluxes were3 g/ha. Carbamazepine, meprobamate, and sulfamethoxazole were most commonly found in drainage water,

representing nearly 80% of all reportable detections. This research indicates the potential of turfgrass soil systems to reduce contaminant loading below the root zone and potentially toward groundwater.

PLANTS AS BIO-INDICATORS OF SUBSURFACE CONDITIONS: IMPACT OF GROUNDWATER LEVEL ON BTEX CONCENTRATIONS IN TREES

Wilson, J., R. Bartz, M. Limmer, and J. Burken.
International Journal of Phytoremediation, Vol 15 No 9, 900-910, 2013

A study was conducted to determine the effect of groundwater level on BTEX concentrations in tree tissue. The central hypothesis was that increased vadose zone thickness promotes biodegradation of BTEX, leading to lower BTEX concentrations in overlying trees. Storage methods for tree core samples also were investigated as a possible reason for tree cores to show lower than expected BTEX levels in some sampling efforts. The water-level hypothesis was supported in a greenhouse study where water table level was found to affect tree BTEX concentrations significantly, indicating that the influx of oxygen coupled with the presence of the tree facilitates aerobic biodegradation of BTEX in the vadose zone.

General News

FRAMEWORK FOR SITE CHARACTERIZATION FOR MONITORED NATURAL ATTENUATION OF VOLATILE ORGANIC COMPOUNDS IN GROUND WATER

Pivetz, B.E., D. Abshire, W. Brandon, S. Mangion, B. Roberts, B. Stuart, L. Vanderpool, B. Wilson, and S.D. Acree.
EPA 600-R-12-712, 89 pp, Dec 2012

Site characterization is essential to provide site-specific data and interpretations to determine if site remedial goals can be met with monitored natural attenuation (MNA) in appropriate remedial time frames, and to provide site-specific data and interpretations to determine the necessary performance monitoring parameters, locations, and frequency for monitoring. A broad overview of technical issues includes development of a conceptual site model, characterization variables, sampling locations and frequencies, problematic issues encountered at MNA sites and approaches to overcome them, and the interpretations related to the MNA decision-making process. This document focuses on characterization of sites where MNA is being considered for remediation of the portion of the site with dissolved-phase VOC (mainly chlorinated solvent and petroleum hydrocarbon compounds) groundwater contamination.
http://nepis.epa.gov/Adobe/PDF/P100HYBY.pdf

MERCURY-ADDED PRODUCTS FACT SHEETS

Northeast Waste Management Officials' Association (NEWMOA), Interstate Mercury Education & Reduction Clearinghouse (IMERC), 2014

Fact sheets on nine types of products summarize data provided by manufacturers and distributors of mercury-added products. The fact sheets cover the amount of mercury used in the products, why mercury has been or continues to be used in the products, who manufactures the products, and other information. A tenth fact sheet summarizes the use of mercury across all product categories and includes a trends analysis of mercury use in products from 2001-2010.
http://www.newmoa.org/prevention/mercury/imerc/factsheets/

TOOL FOR THE REDUCTION AND ASSESSMENT OF CHEMICAL AND OTHER ENVIRONMENTAL IMPACTS (TRACI): TRACI VERSION 2.1 USER'S GUIDE

Bare, J.
EPA 600-R-12-554, 24 pp, 2012

TRACI 2.1 (the Tool for the Reduction and Assessment of Chemical and other environmental Impacts) has been developed for sustainability metrics, life cycle impact assessment, industrial ecology, and process design impact assessment for developing increasingly sustainable products, processes, facilities, companies, and communities. TRACI 2.1 allows an expanded quantification of stressors that have potential effects, such as ozone depletion, global warming, acidification, eutrophication, photochemical smog formation, human health particulate effects, human health cancer, human health noncancer, ecotoxicity, and fossil fuel depletion. http://nepis.epa.gov/Adobe/PDF/P100HN53.pdf
See contact and other information at http://www.epa.gov/nrmrl/std/traci/traci.html.

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.

Mention of non-EPA documents, presentations, or papers does not constitute a U.S. EPA endorsement of their contents, only an acknowledgment that they exist and may be relevant to the Technology Innovation News Survey audience.