Technology Innovation News Survey

Entries for March 1-31, 2013

Market/Commercialization Information

ARCHITECT/ENGINEERING INDEFINITE QUANTITY CONTRACT FOR ENVIRONMENTAL CONSULTING SERVICES FOR THE NORTHEAST AREA

U.S. Postal Service, Northern Facilities Construction CMT, Windsor, CT.
Federal Business Opportunities, FBO-4158, Solicitation 089495-13-A-0039, 2013

The U.S. Postal Service seeks the following environmental services for its Northeast Area (i.e., CT, MA, ME, NH, RI, VT, NY, and NJ): (1) underground and aboveground storage tank services; (2) surveys, monitoring, mitigation plans, and remediation oversight for asbestos-containing materials, lead-based paint, radon, mold, lead in drinking water, and indoor air; (3) general site health and safety; (4) site remediation services provided by state-certified staff; (5) site evaluations for property transactions; (6) emergency response and remedial services and hazardous materials management; (7) permitting (e.g., air and water quality, stormwater management); and (8) plan preparation (e.g., spill prevention control and countermeasures). The contract will be for one base year with four 1-year renewal options, not to exceed a total of $9.5 million. A completed SF 330 should be submitted by May 29, 2013, 3:00 PM EST. Consideration will be given to local firms. https://www.fbo.gov/notices/93b8977c46dafddb47fa33daa4987557

AMERICAN DAM SOIL REMEDIATION

International Boundary and Water Commission, El Paso, TX.
Federal Business Opportunities, FBO-4159, Solicitation IBM13R0002, 2013

The United States section of the International Boundary and Water Commission (USIBWC) intends to issue a solicitation for environmental cleanup services. The cleanup is part of the settlement of the bankruptcy case for ASARCO, a former smelter located next to the USIBWC's American Dam/Carlos Marin Field Office in El Paso, Texas. USIBWC is using settlement funds to clean up soil contaminated with arsenic, cadmium, and lead at the office complex. Existing buildings and utilities, a rock wall, and a Customs and Border Patrol tower must be protected in place during construction as government operations at the field office will continue throughout the construction period. The work will be performed under NAICS Code 562910, Remediation Services, with an associated small business size standard of $14 million. The contract will be firm fixed-price for construction. Approximate date of solicitation issuance is May 1, 2013. https://www.fbo.gov/spg/IBWC/IMD/ElPasoTX/IBM13R0002/listing.html

ENVIRONMENTAL SERVICES TO SUPPORT THE ARMY IN ENVIRONMENTAL MONITORING, RESTORATION, COMPLIANCE, AND REMEDIATION AT A SUPERFUND SITE

U.S. Army Corps of Engineers, USACE District, Sacramento, CA.
Federal Business Opportunities, FBO-4158, Solicitation W91238-13-S-0025, 2013

The U.S. Army Corps of Engineers is conducting market research to determine the availability of firms to perform environmental services and support at the former Fort Ord. All responses will be used to determine the appropriate strategy for a potential future acquisition. The services sought will support environmental monitoring, restoration, compliance, and remediation at a Superfund site that includes endangered species habitats. Responses are due by 3 PM PST, June 3, 2013. https://www.fbo.gov/spg/USA/COE/DACA05/W91238-13-S-0025/listing.html

SMALL BUSINESS INNOVATION RESEARCH PROGRAM PHASE I, FY 2014

National Science Foundation, Funding Opportunity 13-546, 2013

NSF has formulated the following broad solicitation topics for its Small Business Innovation Research (SBIR) Program: (1) Biological and Chemical Technologies; (2) Education Applications; (3) Electronics, Information, and Communication Technologies; and (4) Nanotechnology, Advanced Materials, and Manufacturing. The window for submitting proposals is open from May 11, 2013, to June 11, 2013. Estimated Total Program Funding: $30,000,000. Expected Number of Awards: 200. Award Ceiling: $150,000. NOTE: The submission of the same project idea to both this SBIR Phase I solicitation and the concurrent STTR Phase I solicitation is strongly discouraged. http://www.grants.gov/search/search.do?mode=VIEW&oppId=225796

SMALL BUSINESS TECHNOLOGY TRANSFER PROGRAM PHASE I, FY 2014

National Science Foundation, Funding Opportunity 13-547, 2013

NSF's Small Business Technology Transfer (STTR) program stimulates technological innovation in the private sector by requiring small business concerns to partner with researchers at universities and other non-profit research institutions. This STTR Phase I solicitation aims to encourage the commercialization of research previously funded by NSF. The proposals submitted should fall into one of four broad topic areas: (1) Biological and Chemical Technologies; (2) Education Applications; (3) Electronics, Information, and Communication Technologies; and (4) Nanotechnology, Advanced Materials, and Manufacturing. The window for submitting proposals is open from May 13, 2013, to June 13, 2013. Estimated Total Program Funding: $11,250,000. Expected Number of Awards: 50. Award Ceiling: $225,000.
http://www.grants.gov/search/search.do?mode=VIEW&oppId=225797

SOIL REMEDIATION

Department of the Air Force, Air Force Materiel Command, Tinker AFB, OK.
Federal Business Opportunities, FBO-4170, Solicitation FA8101-13-Q-0028, 2013

Tinker Air Force Base (TAFB) intends to issue a request for quotes for the procurement of services to remediate 4,000 cubic yards of soil where a fuel transfer line released about 8,000 gallons of jet fuel (JP-8) on TAFB (Oklahoma City, Oklahoma) on 9 June 2011. The acquisition is 100% set aside for small businesses under NAICS code 562910. Award of a single firm, fixed-price contract is anticipated. Offers are due no later than May 24, 2013, 12:00 PM CT. https://www.fbo.gov/spg/USAF/AFMC/OCALCBC/FA8101-13-Q-0028/listing.html

BAXTER SPRINGS OU3 — PHASE III

U.S. Environmental Protection Agency, Region 7, Lenexa, KS.
Federal Business Opportunities, FBO-4165, Solicitation SOL-R7-13-00012, 2013

U.S. EPA plans to solicit services for performance of a remedial action for a portion of the mine waste located at the Baxter Springs subsite, Operable Unit #03 (OU-3), of the Cherokee County Superfund site. The selected remedy consists of excavation, consolidation, and disposal of approximately 206,500 cubic yards of mine waste and associated soils contaminated with heavy metals. Remediation will be conducted pursuant to CERCLA and National Contingency Plan requirements. This procurement will be set aside for service-disabled, veteran-owned small businesses under NAICS code 562910. EPA anticipates issuing a fixed-price contract with a contract period of 24 months and an estimated dollar value between $2M to $3M. The solicitation/RFP and more detailed information should be released on or about May 20, 2013, via EPA's acquisition management website (www.epa.gov/oam/regions/index.htm) and https://www.FedConnect.net. https://www.fbo.gov/spg/EPA/OAM/RegVII/SOL-R7-13-00012/listing.html

HELENA NATIONAL FOREST WARM SPRINGS CREEK TAILINGS PROJECT

U.S. Department of Agriculture, Forest Service.
Federal Business Opportunities, FBO-4179, Solicitation AG-03H6-S-13-0003, 2013

The Helena National Forest desires to conduct a CERCLA removal action for ~40,000 cubic yards of heavy metal laden mill tailings from the Warm Springs Creek drainage and placement of the tailings into a nearby constructed repository. The site is located near Clancy, Montana. The solicitation will be published around July 1 as a total small business set-aside. Estimated magnitude of construction is between $500,000 and $1,000,000, subject to availability of funds. https://www.fbo.gov/spg/USDA/FS/398/AG-03H6-S-13-0003/listing.html

A-E SERVICES: HAZARDOUS WASTE AND CERCLA CLEANUP

U.S. Department of Agriculture, Forest Service, Atlanta, GA.
Federal Business Opportunities, FBO-4179, Solicitation AG-43ZP-S-13-0006, 2013

The USDA-Forest Service Southern Regional Office has an ongoing need for Architect-Engineer services, including environmental engineering services, for planning and documentation, compliance, advisory assistance, and waste management consulting. The majority of work will occur within the boundaries of the Southern Region (AL, AR, FL, GA, KY, LA, MS, NC, OK, SC, TN, TX, and VA) as well as Puerto Rico and the U.S. Virgin Islands. This procurement is set aside for service-disabled, veteran-owned small business, NAICS code 541330, with a size standard of $14M. The government expects to award a single indefinite-delivery, indefinite-quantity contract for one base year with four option-year periods. The full solicitation will be posted on or about May 28, 2013. https://www.fbo.gov/spg/USDA/FS/43ZP/AG-43ZP-S-13-0006/listing.html

SOURCES SOUGHT ANNOUNCEMENT FOR RISK ASSESSMENT SUPPORT

U.S. Environmental Protection Agency, Office of Acquisition Management, Washington, DC.
Federal Business Opportunities, FBO-4169, Solicitation SSA-ORCR-2013, 2013

U.S. EPA is conducting market research for the Office of Resource Conservation and Recovery (ORCR) to gain knowledge of potential qualified sources and their size classifications relative to NAICS code 541620, Environmental Consulting Services, for the performance of risk assessment support services (size standard of $14M). ORCR is responsible for the assessment of potential risks and other impacts associated with the generation and management of materials originating in households and businesses, industrial process materials, and residues, and in the management of municipal and industrial solid wastes. Services will require the assessment of potential risks, benefits, costs, economic impacts, and other effects associated with the generation and management of hazardous and non-hazardous waste and hazardous substances. The Government anticipates a single contract award to fulfill this requirement for up to 5 years. Interested small business firms are asked to add their company information to an "Interested Vendors List" and/or to submit a capability statement as a searchable PDF file via email by 3:00 PM ET, May 13, 2013. https://www.fbo.gov/spg/EPA/OAM/HQ/SSA-ORCR-2013/listing.html

DOD SBIR 2013.2

Department of Defense, Washington Headquarters Services, WHS, Acquisition Directorate.
Federal Business Opportunities, FBO-4171, Solicitation DoDSBIR13-2, 2013

Small high-technology firms are encouraged to submit proposals to DoD for its Small Business Innovation Research (SBIR) Program 2013.12 for projects with both military and commercial applications. This SBIR opportunity will be publicly released on May 24, 2013, on the DoD SBIR website at http://www.dodsbir.net/solicitation/. The window for receipt of proposals will close at 6:00 AM ET on June 26, 2013. The solicitation lists all of the R&D topics under which DoD is seeking proposals, and also contains detailed information on the parameters of the SBIR program and how to submit a proposal. [NOTE: The few DoD needs areas for this SBIR opportunity with potential environmental application include A13-079: Convergence of sensor technologies into a tool for assessing environmental contaminants, and DHP13-005: Rapid ID of microbial pathogens from food, water, and environmental samples.] https://www.fbo.gov/spg/ODA/WHS/REE/DoDSBIR13-2/listing.html

EMERGENCY RESPONSE

Department of the Air Force, Air Combat Command, Tyndall AFB, FL.
Federal Business Opportunities, FBO-4158, Solicitation FA4819-12-T-0054, 2013

Air Combat Command is seeking a contractor to provide all manpower, equipment, supplies, oversight and management, recordkeeping, and administration for the services necessary to support emergency and non-emergency response and cleanup activities at Tyndall Air Force Base related to spills and accidental discharges of hazardous and non-hazardous materials. Proposals are due no later than May 17, 2013, 1:00 PM CT. https://www.fbo.gov/notices/46b1612d246cd238bad0487f0ebb530f

Cleanup News

FIRST STATE-FUNDED CLEANUP USING ELECTRICAL RESISTIVITY HEATING TECHNOLOGY

Van Riper, E.
The DEQbicle, Fall 2012

The Remediation and Redevelopment Division of the Michigan Department of Environmental Quality completed remediation of PCE in the soil and groundwater under a former dry cleaning facility in the city of Owosso using electrical resistivity heating (ERH). An operating medical center and restaurant currently occupy the site of the former Launderama Dry Cleaner in Owosso's downtown business district. The restaurant was closed for two weeks while the ERH system was installed below grade. The system comprised 83 borings drilled to a depth of 14 ft, electrodes installed in each boring, and a vapor extraction well at each electrode location. ERH operation began on January 9, 2012, reached the goal temperature of 88°C on March 9, and continued until its decommissioning on June 7, having removed 821 lbs of VOCs. Initial verification sampling conducted in July 2012 indicated >90% reduction in site soil concentrations. Additional soil gas monitoring and verification sampling will continue until the end of 2013.
http://www.deq.state.mi.us/eforms/deqbicle/Fall2012/ThermalRemediation.htm

IN SITU THERMAL DESORPTION OF LNAPL-CONTAMINATED SOIL WITH HIGH-ENERGY EFFICIENCY

Geckeler, G., H. Saadaoui, and J. Haemers.
IPEC 2012: Proceedings of the 19th International Petroleum & BioFuels Environmental Conference, October 29 - November 1, 2012, San Antonio, Texas. 13 slides, 2012

A 2011/2012 in situ thermal desorption (ISTD) remediation of hydrocarbon-contaminated soils was conducted at an active refinery in France. The propane-fueled ISTD system remediated contaminated soils from >10,000 mg/kg to less than 10 mg/kg during 25 days of operation. Gaseous-phase hydrocarbons removed via soil vapor extraction were directed to the ISTD device and used as supplemental fuel, which reduced ISTD propane consumption by over 50%. This technique also destroyed off-gas vapors, removing the need for traditional thermal oxidation equipment to meet local air emissions. The large-scale project used new modular grid arrangements to prevent disruption of refinery operationshttp://ipec.utulsa.edu/Conf2012/Papers_Presentations/Geckeler.pdf

ANAEROBIC TREATMENT AND HYDROCARBON SEEPAGE CONTOL USING MODIFICATIONS TO NATURAL STREAM MORPHOLOGY

Binder, J.
IPEC 2012: Proceedings of the 19th International Petroleum & BioFuels Environmental Conference, October 29 - November 1, 2012, San Antonio, Texas. 28 slides, 2012

Hydrocarbon seeps were entering an oxbow along a creek adjacent to a former refinery at a site in north-central Oklahoma. As an interim remedial measure, the site contractor rerouted the creek and constructed a biologically active interceptor trench in the former oxbow. Varying proportions and mixtures of gravel, limestone sand, wood chips, cow manure, and gypsum were emplaced in different zones with the trench, which collects any free-phase hydrocarbon and treats the impacted waters via anaerobic biological processes prior to discharge to the creek channel. The system is sampled regularly and monitored to assess water quality at the discharge outfall and in groundwater near the treatment trench. http://ipec.utulsa.edu/Conf2012/Papers_Presentations/Binder.pdf

DUS II SOIL GAS SAMPLING AND AIR INJECTION TEST RESULTS

Noonkester, J., D. Jackson, W. Jones, W. Hyde, J. Kohn, and R. Walker.
SRNL-STI-2012-00449, 32 pp, 2012

Soil vapor extraction (SVE) and air injection well testing was performed at the dynamic underground stripping (DUS) site located near the M-Area Settling Basin. The objective of the DUS II tests was to determine the effectiveness of continued system operation in removing PCE and TCE from the subsurface. The SVE operations have utilized residual heat present in the subsurface since steam injection ended on September 19, 2009. While traditional air sparging (AS) is not a primary component of the DUS process (although AS often is coupled with SVE when contaminant recovery is necessary), eight of the 63 steam injection wells were used to inject air after steam injection ended. The test results will be used to determine the wells that should continue in active SVE operation and to identify wells that can be transitioned from active to passive treatment systems. The test data also will be used to provide a technical basis to determine which components of the well infrastructure should remain for future corrective action activities. http://sti.srs.gov/fulltext/SRNL-STI-2012-00449.pdf

GEOCHEMICAL CHARACTERIZATION AND LONGEVITY ESTIMATES OF A PERMEABLE REACTIVE BARRIER SYSTEM REMEDIATING A 90SR PLUME

Hoppe, Jutta, Master's thesis, University of Waterloo, Waterloo, ON, Canada, 144 pp, 2012

In 1998, a "wall and curtain" permeable reactive barrier (PRB) containing clinoptilolite as a reactive material was installed at the Chalk River Laboratories in Chalk River, Ontario, to prevent discharge of a strontium-90 plume into a nearby swamp. After nearly 14 years of operation, refined estimates of the PRB's efficiency and longevity indicate the system is highly efficient in treating an average mass flux of >17,000 Bq/m^2/day and could continue to function for 80 to 100 years. http://uwspace.uwaterloo.ca/handle/10012/7293

LESSONS LEARNED FROM IMPLEMENTATION OF IN-SITU CHEMICAL OXIDATION REMEDIATION

Pickens, W.E., R.P. Hultgren, and J. TeGrotenhuis.
2012 Taipei International Conference on Remediation and Management of Soil and Ground Water Contaminated Sites, October 30-31, 2012, Taipei, Taiwan. 677-703 (paper & slides), 2012

A well-studied site located in Denver, Colorado, is contaminated with chlorinated solvents, pesticides, and herbicides from its former use as a chemical distribution facility. A PCE plume in the groundwater extends about 0.7 kilometers downgradient from the facility, and PCE concentrations in groundwater were detected at levels up to 6,700 µg/L. A combination of shallow impacted soil excavation, soil vapor extraction, and in situ chemical oxidation (ISCO) using sodium permanganate was identified as the most viable remedial approach. ISCO injections were performed in December 2007 and August-September 2010. Groundwater samples collected 20 months after the second round of injections showed 70-100% (by weight) decreases in PCE concentration in monitoring wells within 22 meters of the injection locations, as well as significant reductions in PCE concentrations in the majority of the monitoring wells within 91 meters downgradient of the injection wells. [*The paper begins on **page 677** in the portion of the proceedings (pages 611-768) that opens at the link.*]
http://sgw.epa.gov.tw/resag/Update_Data/Information9051423Oct_30-31_Proceedings_1106_1230_Brief_S10-11.pdf

TAMING THE "TOWER PLUME"

Zaney, R.
The Military Engineer, Vol 105 No 681, Nov-Dec 2012

Reese Air Force Base was recommended for closure in 1991, but property transfer was stalled by contamination issues: petroleum products and chlorinated solvents contaminated the soil and groundwater, with one of the solvent plumes extending more than two miles off base, affecting more than two dozen residential water systems. Enhanced in situ biodegradation was implemented using molasses as the electron donor. Coupled with an innovative directed groundwater recirculation system, pump-and-treat technology was used to decrease the size of the plume. The elevated dissolved oxygen levels in the treated water helped restore the portions of the aquifer that had undergone reductive dechlorination. Groundwater monitoring results were used to adjust the extraction and injection patterns on at least a quarterly basis to target the plume reduction. The Tower Plume has been shrinking by 2-3 acres per week since 2006. From the original 800 acres of contaminated groundwater, today less than one acre of contamination remains. Environmental regulators require three annual clean sample results before the Air Force can officially complete remediation of the plume at Reese, estimated for 2014.
http://themilitaryengineer.com/index.php/component/k2/item/192-taming-the%E2%80%9Ctower-plume%E2%80%9D

EVAPORATIVE DESORPTION TECHNOLOGY (EDT): AN ADVANCEMENT IN FLAMELESS THERMAL REMEDIATION

Sutton, M.C., P.D. Horton, P.R. Brady, and D.W. Moore.
RemTEC Summit, 4-6 March 2013, Westminster, Colorado. Poster, 2013

Elevated concentrations of PCE >50,000 µg/kg and degradation compounds remained in tight, Bay mud soil at a former industrial dry cleaning facility located near the margin of the San Francisco Bay. Following excavation and off-site disposal of the more accessible contaminated soil, implementation of evaporative desorption technology (EDT) reduced PCE concentrations to below 20 µg/kg, and in most cases below 5 µg/kg. EDT is differentiated from other thermal technologies by the lower treatment temperature, limited air emissions, regulatory acceptance and permitting (similar to soil vapor extraction), and the remedial certainty of ex situ treatment by excavation and on-site treatment and reuse.
Poster: http://www.reterro.com/edt-advancement.pdf
Longer abstract: http://www.remtecsummit.com/index.php/component/content/article?id=498:amin-bio&catid=232

CONSTRUCTION AND OPERATION OF A GRAVEL BED REACTOR: BIODEGRADATION OF NITRATE

Fricke, R.
Symposium: Salt and Nitrate in Groundwater: Finding Solutions for a Widespread Problem, June 13-14, 2012, Fresno, CA. Groundwater Resources Association of California, Abstract only, 2012

Several bioremediation methods have been tested and implemented at Aerojet's inactive Rancho Cordova test site. The current system consists of a gravel bed reactor (GBR) for treating nitrate and perchlorate. Citric acid is the electron donor, and indigenous bacteria utilize the oxygen from nitrate and perchlorate during the respiration of the citric acid. The GBR was constructed using a 40-foot shipping container, PVC liner, and 3/4-inch crushed rock. It has a pore volume of about 7,200 gallons. With a probable hydraulic capacity of 100 gallons per minute (gpm), the GBR currently operates at about 30 gpm. Influent nitrate concentrations varied from 10-13 mg/L during 2012; effluent concentrations have ranged from non-detect to 0.2 mg/L. Perchlorate concentrations varied from 0.1-0.3 mg/L in the influent but were non-detect in effluent during 2012. The GBR could treat much higher perchlorate concentrations. Sulfate can be reduced in the GBR if the oxidation-reduction potential (ORP) is too low. Iron and manganese are mobilized by the low ORP but generally have declined in concentration.

Demonstrations / Feasibility Studies

IN SITU 'DELIVERABILITY' TRIALS USING CALCIUM POLYSULPHIDE TO TREAT CHROMIUM CONTAMINATION AT SHAWFIELD, GLASGOW

Bewley, R. and G. Sojka.
CL:AIRE (Contaminated Land: Applications in Real Environments), Technology Demonstration Project Bulletin TDP30, 8 pp, Feb 2013

Calcium polysulfide (CaSx) reduces highly soluble Cr(VI) compounds to much less soluble and comparatively harmless Cr(III) compounds. Following earlier field trials that indicated the effectiveness of CaSx application in reducing Cr(VI) associated with chromite ore processing residue, another field trial was conducted in 2009 to identify the most effective mechanism for delivering CaSx into the subsurface. The CaSx delivery methods investigated were (1) a groundwater recirculation system (which also achieved in situ flushing of contaminated soil); (2) direct-push injection using close grid spacing; and (3) soil mixing. All three trials provided evidence of total Cr mobilization as a combination of chemical-physical action. [NOTE:*The bulletin is available without charge on the CL:AIRE website to registered users (also free) at http://www.claire.co.uk/ An online read-only copy is available at http://www.slideshare.net/slideshow/embed_code/20401310*]

REMEDIATION OF A FORMER GASWORKS USING IN-SITU SOLIDIFICATION TECHNOLOGY

von Schwerin, B., P. Carstairs, and C. Cowper.
2012 Taipei International Conference on Remediation and Management of Soil and Ground Water Contaminated Sites, October 30-31, 2012, Taipei, Taiwan. 549-561 (paper & slides), 2012

The proposed upgrade of an existing car park on a former gasworks site in Australia led to the identification of significant residual gasworks contamination in the form of coal tar DNAPL despite remediation activities conducted 16 years earlier. Proof-of-performance bench-scale and field pilot trials of in situ solidification enabled the selection of a cost-effective remediation approach to address future site needs and meet performance requirements. The adopted remediation strategy incorporates a holistic approach to managing site issues by addressing the impacted shallow soil with ex situ solidification; tarry soil below the water table with in situ solidification; impacts in groundwater with pump and treat; and community engagement throughout the project.[*The paper begins on **page 549** in the portion of the proceedings (pages 423-610) that opens at the link.*]
http://sgw.epa.gov.tw/resag/Update_Data/Information9053129Oct_30-31_Proceedings_1106_1230_Brief_S7-9.pdf

ENGINEERED PHYTOREMEDIATION OF BENZENE, GROS, DROS AND OTHER VOCS IN GROUNDWATER

Gatliff, E.G., F. Manale, S. Lucas, and M. Siegman.
IPEC 2012: Proceedings of the 19th International Petroleum & BioFuels Environmental Conference, October 29 - November 1, 2012, San Antonio, Texas. 43 slides, 2012

Two phytoremediation pilots were installed in 2007 at sites in central Michigan to assess the potential for engineered phytoremediation to (1) gain hydraulic control of the local groundwater units and (2) remediate groundwater containing elevated concentrations of dichloropropane, benzene, gasoline range organics (GROs), diesel range organics (DROs), and other VOCs. The Root_Sleeve™ liner of the TreeWell® engineered phytoremediation system is designed to treat the groundwater via a bioreactor effect before the groundwater contacts the root system. This bioreactor effect is demonstrated in the sampling data as well as by the absence of phytotoxic effects of the elevated contaminant concentrations on the trees, most of which realized aggressive and healthy growth. The few occurrences of phytotoxicity were attributed to elevated chloride levels. Hydraulic data show increasing hydraulic effects with each growing season. Groundwater in the pilot study area has shown progressive reductions in contaminant concentrations (~20% cumulatively) over the 5-year term of the study.http://ipec.utulsa.edu/Conf2012/Papers_Presentations/Gatliff.pdf

OCCURRENCE AND REMEDIATION OF PCE AND OTHER CHLORINATED SOLVENTS IN SYDNEY URBAN GROUNDWATER SYSTEMS

Nash, J.M., L. Rockett, and K. Plambeck.
Crete 2012: 3rd International Conference on Industrial and Hazardous Waste Management. Technical University of Crete, 7 pp, 2012

This paper examines the investigation and remediation strategies adopted for two PCE-contaminated sites in the Sydney (Australia) metropolitan area and looks at the similarities and differences in terms of the contaminant transport mechanisms, lithological conditions, effects on neighboring properties, and the remedial strategies adopted (i.e., monitored natural attenuation and a biostimulation pilot study, respectively). The lessons learned can be applied to the investigation and remediation of similar sites. http://www.srcosmos.gr/srcosmos/showpub.aspx?aa=16575

COMPARISON OF APPROACHES TO ENGINEERED IN SITU BIOGEOCHEMICAL TRANSFORMATION OF CHLORINATED SOLVENTS

Henry, B.M.
REMTECH 2012: The Remediation Technologies Symposium, Banff, AB, Canada, 17-19 Oct 2012. Environmental Services Association of Alberta, Edmonton, AB (Canada), 37 slides, 2012

The U.S. Air Force has funded demonstrations to stimulate biogeochemical transformation of chlorinated solvents by addition of iron and sulfate into the subsurface at Air Force facilities in Alaska, Utah, Oklahoma, and Hawaii. Two demonstrations involved injection of various forms of sulfate, iron, and emulsified vegetable oil directly into the subsurface. Another demonstration involved the injection of ferrous sulfate into a solar-powered recirculating bioreactor. The fourth demonstration involved emplacement of a high-iron basalt sand in a mulch bioreactor within a high-sulfate groundwater plume. Stimulating biogeochemical transformation of PCE and TCE was most effective where a source of sulfate was sustained and organic substrate was limited to http://www.esaa-events.com/remtech/2012/pdf/12-Henry.pdf

INTEGRATED FORENSICS APPROACH TO FINGERPRINT PCB SOURCES IN SEDIMENTS USING RAPID SEDIMENT CHARACTERIZATION (RSC) AND ADVANCED CHEMICAL FINGERPRINTING (ACF)

Leather, J., G. Durell, G. Johnson, and M. Mills.
ESTCP Project ER-200826, SPAWAR Technical Document 3262, 228 pp, June 2012

To identify PCB sources to sediments, this project demonstrated an integrated approach to fingerprinting PCB contamination that combines sediment screening technologies on a large number of field samples followed by detailed PCB congener analysis in conjunction with advanced chemical fingerprinting data interpretation on a subset of selected laboratory samples. Sites with extensive preexisting data sets were selected for the demonstration: the South Basin at Hunters Point Shipyard, located south of San Francisco, and the Ashtabula River Dredge site, located east of Cleveland. All the techniques discussed in this report are commercially available from multiple sources. http://www.serdp-estcp.org/content/download/18183/202326/file/ER-200826-ER.pdf *See also the ESTCP Cost and Performance Report*: http://www.serdp-estcp.org/content/download/18182/202316/file/ER-200826-C&P.pdf

COMPARATIVE DEMONSTRATION OF ACTIVE AND SEMI-PASSIVE IN SITU BIOREMEDIATION APPROACHES FOR PERCHLORATE IMPACTED GROUNDWATER: ACTIVE IN SITU BIOREMEDIATION DEMONSTRATION (AEROJET FACILITY)

Cox, E. and T. Krug.
ESTCP Project ER-200219, 848 pp, Dec 2012

During the demonstration of active enhanced in situ bioremediation at the inactive Rancho Cordova test site in California, groundwater containing perchlorate and TCE was extracted from the shallow aquifer, amended with ethanol, and recharged to the shallow aquifer to promote in situ biodegradation of the contaminants. The active biobarrier provided treatment and containment of a 600-ft wide section of the plume in the shallow aquifer using two groundwater extraction wells and a single groundwater recharge well. Results demonstrate that the site's indigenous bacteria are capable of biodegrading perchlorate using ethanol as an electron donor. Perchlorate concentrations as high as 4,300 µg/L were reduced to less than 4 µg/L within 50 ft of the recharge well. TCE dechlorination was observed at the downgradient monitor well following bioaugmentation of the shallow aquifer with KB-1 to introduce dehalorespiring bacteria. http://www.serdp-estcp.org/content/download/17440/194744/file/ER-200219-ER.pdf

COMBINING LOW-ENERGY ELECTRICAL RESISTANCE HEATING WITH BIOTIC AND ABIOTIC REACTIONS FOR TREATMENT OF CHLORINATED SOLVENT DNAPL SOURCE AREAS

Macbeth, T., M.J. Truex, T. Powell, and M. Michalsen.
ESTCP Project ER-200719, 383 pp, Dec 2012

Project ER-0719 demonstrated the combination of low-temperature subsurface heating with in situ remedies to enhance remediation performance through both increased degradation reaction rates and contaminant dissolution. Dechlorination was induced in two test cells for zero-valent iron (ZVI) and in situ bioremediation (ISB) using emulsified oil and whey powder. For the ZVI test, temperature elevated from 10°C to between 35-45°C increased dechlorination by a factor of 4 to 8. For the ISB test, a similar temperature increase accelerated overall contaminant dechlorination by a factor of 2-4 at hotspot locations close to residual contaminant mass. Field test results demonstrated that moderate heating and minor operational costs enhanced efficiency and effectiveness of in situ treatment of TCE. Capture and treatment of contaminated vapor—a major cost element of standard thermal treatment—was not needed as treatment maintained low aqueous TCE concentrations. The heating infrastructure was limited to subsurface electrodes and a power control unit. Results indicate the combined methods may be cost-effective in source zones with moderate contaminant mass. http://www.serdp-estcp.org/content/download/18254/202725/file/ER-200719-ER.pdf

TRIP REPORT: PRODUCED-WATER FIELD TESTING

Sullivan, E.J.
LA-UR-12-21661, 11 pp, 2012

Los Alamos National Laboratory conducted field testing of a produced-water pretreatment apparatus with assistance from faculty at Texas A&M University. The purpose of the test was to use a new, commercially available filter media housing containing a modified zeolite (surfactant-modified zeolite, or SMZ) porous medium for use in pretreatment of oil and gas produced water (PW) and fracturing flowback waters. In lab tests, the SMZ performed well in removing BTEX from produced water. A pilot-scale test conducted in a treatment trailer demonstrated the use of a commercial filter housing packed with SMZ combined with a simple flow modification for removing BTEX from a produced water source in College Station, Texas. http://permalink.lanl.gov/object/tr?what=info:lanl-repo/lareport/LA-UR-12-21661
Additional information is available in a slide presentation at http://ipec.utulsa.edu/Conf2012/Papers_Presentations/Goltz.pdf

ENGINEERED PHYTOREMEDIATION PILOT STUDY FOR PETROLEUM HYDROCARBONS IN A DEEP CONFINED AQUIFER

Gatliff, E. and B. Snow.
IPEC 2012: Proceedings of the 19th International Petroleum & BioFuels Environmental Conference, October 29 - November 1, 2012, San Antonio, Texas. 43 slides, 2012

The groundwater at a former petroleum refinery in Oklahoma is contaminated with benzene within an area exceeding 350 acres. An engineered phytoremediation feasibility study was installed to achieve hydraulic control of contaminant migration. Mobile- and residual-phase LNAPL is trapped within the confined aquifer beneath a 15-25 ft thick confining aquitard unit that overlies portions of the site. A plantation of 96 trees was installed using the TreeWell® system in five test plots: a background control group, two areas with LNAPL, a main test plot in an area with high dissolved benzene concentrations, and a closed tree lysimeter plot that measures water consumption rates. Preliminary data from the pilot study are presented. http://ipec.utulsa.edu/Conf2012/Papers_Presentations/Gatliff_EngineeredPhytoremediation_102.pdf

IN SITU SODIUM PERSULFATE OXIDATION OF BENZENE UNDER AMBIENT ACTIVATION

Shepherd, C., E. Reece, M. Klemmer, K. Brantingham, and S. Rhodes.
2012 AHS Annual Water Symposium, September 18-21, 2012, Phoenix, AZ. 21 slides, 2012

A pilot study was conducted in Tempe, Arizona, to optimize an in situ chemical oxidation (ISCO) remedial design for gasoline-affected groundwater. Sodium persulfate (under ambient activation, with no activator compound) and deuterated water (as a conservative tracer) were used to support the design of a prospective full-scale ISCO remedy. The injection of an 8,600-gallon solution of 40 g/L sodium persulfate and 900 per mil deuterium (~0.25 g/L) showed relatively even vertical and lateral distribution of solution around the injection well, with sodium persulfate concentrations as high as 25 mg/L up to 13 ft from the injection well. The kinetic reaction rate was found to be relatively rapid, given the ambient activation method. Following the pilot injection, dissolved benzene concentrations in the area of influence declined 50% on average from initial conditions.
Longer abstract: http://azhydrosoc.org/2012Symposium/docs/abstracts/1f_Shepherd_et%20al.pdf
Slides: http://azhydrosoc.org/2012Symposium/docs/presentations/1f_Shepherd_ISCO_Ambient_Pilot.pdf

SULFATE REDUCTION IN GROUNDWATER: CHARACTERIZATION AND APPLICATIONS FOR REMEDIATION

Miao, Z., M.L. Brusseau, K.C. Carroll, C. Carreon-Diazconti, and B. Johnson.
Environmental Geochemistry & Health, Vol 34 No 4, 539-550, Aug 2012

Sulfate reduction reactions play a significant role in mediating redox conditions and biogeochemical processes for subsurface systems. They also serve as the basis for innovative in-situ methods for groundwater remediation. This paper provides an overview of sulfate reduction in subsurface environments with a specific focus on implications for groundwater remediation resulting from acid mine drainage. A case study presenting the results of a pilot-scale ethanol injection illustrates the advantages and difficulties associated with the use of electron-donor amendments for sulfate remediation.

Research

AN INNOVATIVE TECHNIQUE FOR REMEDIATION OF GROUNDWATERS: DISCONTINUOUS PERMEABLE REACTIVE BARRIERS

Bortone, I., A. Di Nardo, M. Di Natale, D. Musmarra, and G.F. Santonastaso.
Crete 2012: Third International Conference on Industrial and Hazardous Waste Management, Technical University of Crete, 8 pp, 2012

In this work, an innovative solution for a permeable reactive barrier (PRB) is based on the proposed design for a discontinuous PRB (PRB-D), using absorbing materials and configured as a grid of deep passive wells. This solution would allow the application of PRB technology to deep aquifers and make its realization more flexible and less costly. A well-characterized PCE-contaminated aquifer close to Naples (Italy) provides the setting for the modeled design, and the results are compared with those obtained for a continuous PRB on the same site. http://www.srcosmos.gr/srcosmos/showpub.aspx?aa=16571

ASSESSING PERFORMANCE AND CLOSURE FOR SOIL VAPOR EXTRACTION: INTEGRATING VAPOR DISCHARGE AND IMPACT TO GROUNDWATER QUALITY

Carroll, K.C., M. Oostrom, M.J. Truex, V.J. Rohay, and M.L. Brusseau.
Journal of Contaminant Hydrology, Vol 128 Nos 1-4, 71-82, 2012

After soil vapor extraction (SVE) has been operated for a period of time and the remaining contamination is located primarily in low-permeability zones, the remedy performance needs to be evaluated to determine whether the SVE system should be optimized, terminated, or transitioned to another technology to replace or augment SVE. Mathematical-model simulations can be used to characterize the relationship between the short-term source vapor mass discharge rate, measurable using SVE system operational data, and predicted groundwater contaminant concentration as a function of vadose zone source size and strength. The method enables consideration of alternative conceptual site models to evaluate how uncertainty in site parameters affects the predicted impact to groundwater. [*See slide 9 in "DOE Case Studies: End States for Vadose Zone Environments" at http://cluin.org/meetings/frtr/presentations/truex-presentation.pdf for an illustration of the SVE guidance and calculation tool.*]

FIELD-SCALE ASSESSMENT OF DESICCATION IMPLEMENTATION FOR DEEP VADOSE ZONE CONTAMINANTS

Truex, M.J., M. Oostrom, C.E. Strickland, G.B. Chronister, M.W. Benecke, and C.D. Johnson.
Vadose Zone Journal, Vol 11 No 4, 2012

Desiccation of the vadose zone has the potential to reduce the flux of contaminants to underlying groundwater by removing moisture and decreasing the water-relative permeability of the desiccated zone. Implementation of desiccation was field-tested by injecting dry nitrogen gas to a target treatment zone and monitoring the spatial and temporal progress of the drying process. The test was conducted adjacent to one of the former disposal cribs in a contaminated (primarily technetium-99 and nitrate) portion of the vadose zone dominated by fine sands with lenses of loamy sand. Desiccation removed over 18,000 kg of water from the test zone within the 151-day active desiccation period. The lateral and vertical distribution of drying from the injection well was influenced by the subsurface heterogeneity, with initial drying in higher permeability zones. Over time, desiccation also occurred in the wetter, lower permeability lenses.

BEHAVIOR AND FATE OF PFOA AND PFOS IN SANDY AQUIFER SEDIMENT

Ferrey, M.L., J.T. Wilson, C. Adair, C. Su, D.D. Fine, X. Liu, and J.W. Washington.
Groundwater Monitoring & Remediation, Vol 32 No 4, 63-71, 2012

Microcosms were constructed with sediment from beneath a landfill that received waste containing PFOA (perfluorooctanoic acid) and PFOS (perfluorooctane sulfonate). Observation suggests that the sorption of PFOA and PFOS at near-neutral pH was controlled by electrostatic sorption on ferric oxide minerals and not by sorption to organic carbon. Results indicate that accurate predictions of PFOA and PFOS mobility in groundwater should be based on empirical estimates of sorption using affected aquifer sediment. This paper is Open Access at http://onlinelibrary.wiley.com/doi/10.1111/j.1745-6592.2012.01395.x/full

MATERIAL FLOW ANALYSIS: AN EFFECTIVENESS ASSESSMENT TOOL FOR IN SITU THERMAL REMEDIATION

Laumann, S., V. Micic, J. Fellner, D. Clement, and T. Hofmann.
Vadose Zone Journal, Vol 12 No 1, 2013

The effectiveness of in situ thermal desorption (ISTD) in the vadose zone was assessed by applying material flow analysis (MFA). The simultaneous application of heat and vacuum via ISTD was used to remove a chlorinated solvent source from unsaturated soil beneath an existing aboveground infrastructure. The remediation target value in soil vapor was achieved after nine months of remediation, demonstrating the time efficiency of ISTD for this particular site. The principle of matter conservation used in MFA enabled the quantification of chlorinated solvent flows in soil, groundwater, and soil vapor and also provided an overview of the processes and contaminant transformations occurring in these compartments during the course of remediation.

LONG-TERM PAH MONITORING RESULTS FROM THE ANACOSTIA RIVER ACTIVE CAPPING DEMONSTRATION USING POLYDIMETHYLSILOXANE (PDMS) FIBERS

Lampert, D.J., X. Lu, and D.D. Reible.
Environmental Science: Processes & Impacts, Vol 15 No 3, 554-562, 2013

Passive PDMS measurements of high-resolution vertical pore water concentration profiles were used to infer fate and transport of PAHs at a field demonstration of active caps on contaminated sediments at the Anacostia River in Washington, DC. The pore water concentration profiles were used to assess chemical migration through the capping materials. Solid-phase concentration could not be used for comparison due to the limited sorption capacity of sand. Because of surface re-contamination, low sorption capacity in the demonstration caps, and strong tidal pumping effects, steady-state contaminant profiles were reached in the caps several years after placement. The measurements indicated lower contamination levels in the capped areas relative to the control area.

REMOVAL OF ARSENIC AND HEAVY METALS FROM POTABLE WATER BY BAUXSOL IMMOBILIZED ONTO WOOL FIBERS

Hassan, M.M. and J.F. Davies-McConchie.
Industrial & Engineering Chemistry Research, Vol 51 No 28, 9634-9641, 2012

Filters made from Bauxsol immobilized onto wool were investigated for removal of arsenite and heavy metals from water. The exhaustion technique was found most effective for immobilizing Bauxsol onto wool. Of the two types of Bauxsol investigated—unneutralized (Bauxsol-A) and acid-neutralized (Bauxsol-B)—the removal efficiency of arsenite by Bauxsol-B was considerably higher (53.3%) than that of Bauxsol-A (34.4%). A pilot-scale trial of a Bauxsol-B-bonded wool fiber filtration system showed that it successfully removed arsenite, lead, copper, and zinc from water. The best results were obtained for the removal of lead and copper, as their removal reached 100% and 96%, respectively. Increased contact time had a significant effect on removal efficiency; e.g., removal of copper increased from 10.2% to 96% when the contact time was extended from 5.4 min to 86.4 min.

REMOTE SENSING TECHNIQUES FOR PREDICTING EVAPOTRANSPIRATION FROM MIXED VEGETATED SURFACES

Nouri, H., S. Beecham, F. Kazemi, A.M. Hassanli, and S. Anderson.
Hydrology and Earth System Sciences Discussions, Vol 10, 3897-3925, 2013

Quantifying evapotranspiration (ET) from mixed landscape vegetation environs, such as innovative ET covers, is complicated and challenging due to the heterogeneity of plant species, canopy covers, and microclimates, as well as the potentially costly methodological requirements. This review discusses the strengths and weaknesses of general remote sensing-based approaches to estimate ET. Because most of them are expensive and need extensive time investment and a medium to high level of skill, the simplest approach is recommended for application to mixed vegetation, and the vegetation indices-based approach is discussed for two categories of agricultural and non-agricultural environhttp://www.hydrol-earth-syst-sci-discuss.net/10/3897/2013/hessd-10-3897-2013-print.pdf

APPLICATION OF MICROWAVE-ASSISTED TECHNOLOGIES FOR THE ANALYSIS OF CHLORINATED SOLVENTS IN ROCK SAMPLES

Kusinski, Matthew, Master's thesis, University of Waterloo, ON, Canada. 95 pp, 2012

Rock cores used in the study of microwave-assisted technologies to analyze chlorinated solvents present in rock samples were collected from a dolostone aquifer in Guelph, Ontario, Canada. The cores possessed low permeability for analyte extraction while containing significant moisture internally in micropores. A technique that combines microwave heating, purge-and-trap concentration, and cryotrap focusing achieved results comparable to the established MAE-GC-µECD method while avoiding extraction solvent costs, sample cross-contamination from aliquot removal, or analyte loss. The method allows the operator to monitor relevant ion fragments via the use of a mass selective detector, which is particularly useful when performing extractions of environmental samples contaminated with numerous pollutants.
http://uwspace.uwaterloo.ca/handle/10012/6535

EVALUATION OF ZEROVALENT ZINC FOR TREATMENT OF 1,2,3-TRICHLOROPROPANE-CONTAMINATED GROUNDWATER: LABORATORY AND FIELD ASSESSMENT

Salter-Blanc, A.J., E.J. Suchomel, J.H. Fortuna, J.T. Nurmi, C. Walker, T. Krug, S. O'Hara, N. Ruiz, T. Morley, and P.G. Tratnyek.
Groundwater Monitoring & Remediation, Vol 32 No 4, 42-52, 2012

The efficacy and feasibility of using zero-valent zinc (ZVZ) to treat 1,2,3-trichloropropane (TCP)-contaminated groundwater was assessed in lab and field experiments. The reactivity of commercially available granular ZVZ toward TCP was measured in bench-scale batch-reactor and column experiments, and the results were used to design columns for on-site pilot-scale treatment of contaminated groundwater at a site in Southern California. Two of the ZVZ materials tested were found to produce relatively high rates of TCP degradation as well as predictable behavior when scaling from bench-scale to field testing. Little decrease in TCP degradation rate was observed over the duration of field testing, and no secondary impacts to water quality were identified. [*Additional information on this work is available at http://www.ebs.ogi.edu/tratnyek/resources/docs/Salter10-TCPvsZVZ-Chlorcon525.pdf*]

PERMEABLE ADSORBING BARRIER FOR GROUNDWATER PROTECTION FROM SINGLE-COMPOUNDS AND MULTICOMPONENT CONTAMINATION BY CHLORINATED ORGANIC COMPOUNDS

Bortone, I., A. Di Nardo, M. Di Natale, A. Erto, and D. Musmarra.
Chemical Engineering Transactions, Vol 35, 2013

This paper presents a procedure for designing a permeable adsorbing barrier (PAB) for the remediation of an aquifer contaminated by PCE and TCE at a site located near a solid waste landfill in the metropolitan area north of Naples (Italy). Based on hydrological and geotechnical characterization of the entire contaminated aquifer, the design and optimization of the barrier parameters (location, orientation, and dimensions) are defined by an iterative procedure using a computational fluid dynamics approach. Adsorption tests on a commercial activated carbon were carried out to support the PAB design. Model results indicate that the PAB design is effective for the remediation of the contaminated aquifer for both single-compound and binary contamination; effluent flowing out of the barrier is lower than the concentration limits provided for Italian groundwater quality regulations.http://www.aidic.it/pres13/full/9bortone.docx

WHAT ABOUT THE PRACTICAL IMPLEMENTATION OF GEOSTATISTICS FOR CONTAMINATED SITES AND SOILS?

Demougeot-Renard, H., M. Garcia, and N. Jeannee.
Ninth International Geostatistics Congress, 11-15 June 2012, Oslo, Norway. 14 pp, 2012

The aim of the geostatistical study of a former gasworks located in France, where soils showed high levels of PAHs, was to (1) assess and locate the volume of contaminated soil, (2) compare the estimates with the remediation results, and (3) quantify and position the residual pollution after remediation. The major drawbacks of the available data were a highly heterogeneous support (from 0.1 to 2.3 m in height) and an irregular distribution of samples. The best compromises were obtained by fitting variogram models using all the data set for the range and only the data of small support for the sill, and by conditioning the PAH simulations using the whole data set. Confrontation of the geostatistical model to the remediation results was performed at different scales, and required a discussion on the cumulative effects of data support, heterogeneity of the pollutant phenomenon, and sampling/analytical errors. Most of the residual pollution after remediation appeared to be associated with areas where probabilities of exceeding the regulatory levels were low, which questioned the relevance of the stationarity hypothesis and required explanations to the decision-makers. The key to successful communication seemed to be providing the essential information but not the details, making understandable the different sources of uncertainty, and producing illustrations directly usable by the decision-makers.http://geostats2012.nr.no/pdfs/1747957.pdf

VACUUM THERMAL TREATMENT OF PCB CONTAMINATED POLE TRANSFORMERS USING VOLTAGE ADJUSTER

Ohm, T.I., H.S. An, S.S. Park, K.H. Kim, J.S. Chae, and S.H. Moon.
Crete 2012: 3rd International Conference on Industrial and Hazardous Waste Management. Technical University of Crete, 6 pp, 2012

A vacuum thermal recycling (VTR) process with an adapted voltage adjuster ("improved VTR") was applied to 50 and 75 kVA pole transformers containing 11.8 and 214.8 mg/L PCBs, respectively. The residual total PCBs were below detection for all sample types—copper coil, iron core, paper, wood, and porcelain—results that satisfy the limit concentration standard for the Republic of Korea. To raise the temperature of copper coil from room temperature to between 200-230°C, the original VTR method consumed 292 to 406 kWh, whereas the improved method required 102 to 131 kWh. The voltage adjuster adapted for improved VTR achieved this temperature increase with input energies of ~5 kWh for the 75 kVA transformer and 3 kWh for the 50 kVA transformer. The original VTR method required three to five times longer than the improved VTR method to complete this process. Moreover, no separation of transformer components is required prior to the improved VTR process, which makes it more cost-effective than the original method because it reduces both power consumption and the treatment timeframe. Additional results show that this method was efficient and effective for treating PCB-contaminated transformers and other solid-phase, PCB-contaminated waste.
http://www.srcosmos.gr/srcosmos/showpub.aspx?aa=16431

EVALUATING TCE ABIOTIC AND BIOTIC DEGRADATION PATHWAYS IN A PERMEABLE REACTIVE BARRIER USING COMPOUND SPECIFIC ISOTOPE ANALYSIS

Lojkasek-Lima, P., R. Aravena, O. Shouakar-Stash, S.K. Frape, M. Marchesi, S. Fiorenza, and J. Vogan. Groundwater Monitoring & Remediation, Vol 32 No 4, 53-62, 2012

A pilot-scale zero-valent iron (ZVI) permeable reactive barrier (PRB) was installed using azimuth-controlled vertical hydrofracturing at an industrial facility to treat a plume of chlorinated VOCs. Following ZVI injection, no significant reduction in concentration was observed with the exception of some multilevel monitoring wells, which also showed high levels of total organic carbon. These patterns suggested that the ZVI was not well distributed in the PRB, creating leaky conditions. The geochemical data indicated reducing conditions in the areas where VOC reduction was observed, suggesting that biotic processes associated with the guar used in the ZVI injection could be a major mechanism of VOC degradation. Compound-specific isotope analysis using both carbon and chlorine stable isotopes showed enriched isotope values around the PRB compared to the isotope composition of the VOC source, confirming that VOC degradation is occurring along the PRB. Test results showing differences in isotopic trends combined with changes in VOC concentrations and redox parameters indicated that biotic processes likely are the major pathways involved in the degradation of VOCs near the PRB.

A TRACER TEST TO CHARACTERIZE TREATMENT OF TCE IN A PERMEABLE REACTIVE BARRIER

Shen, H., J.T. Wilson, and X. Lu.
Groundwater Monitoring & Remediation, Vol 32 No 4, 32-41, 2012

A tracer test was conducted to characterize the flow of groundwater across a permeable reactive barrier (PRB) constructed with plant mulch (a biowall) at the OU-1 site on Altus Air Force Base, Oklahoma. Constructed to intercept and treat TCE-contaminated groundwater in a shallow aquifer, the biowall is 139 m long, 7.3 m deep, and 0.5 m wide. Breakthrough of bromide injected from an upgradient well into the groundwater as a conservative tracer was observed subsequently in monitoring wells within and downgradient of the biowall. The bromide breakthrough data demonstrate that groundwater entering the biowall migrated across it, following the slope of the local groundwater surface. The tracer data enabled estimation of the average seepage velocity of groundwater (~0.06 m/d), average residence time of groundwater in the biowall (10 d), and other performance factors. The approach used in this study provides an objective evaluation of the remedial performance of the biowall that can provide a basis for design of other biowalls intended to remediate TCE-contaminated groundwater.

HYDROGEL TRACER BEADS: THE DEVELOPMENT, MODIFICATION, AND TESTING OF AN INNOVATIVE TRACER FOR BETTER UNDERSTANDING LNAPL TRANSPORT IN KARST AQUIFERS

Laskoskie, A., H.M. Edenborn, and D.J. Vesper.
2012 GSA Annual Meeting and Exposition, Charlotte, North Carolina, Poster, 2012 [NETL-462]

Research is under way to develop proxy tracers that mimic contaminant movement the better to understand and predict contaminant fate and transport in karst aquifers. Hydrogel tracer beads are transported as a separate phase in water and can used as a proxy tracer to mimic the transport of NAPL. The beads can be constructed with different densities, sizes, and chemical attributes. This poster describes the creation and optimization of the beads and the field testing of buoyant beads, including sampling, tracer analysis, and quantitative analysis. The buoyant beads are transported ahead of the dissolved solutes, suggesting that LNAPL transport in karst may occur faster than predicted from traditional tracing techniques http://www.osti.gov/bridge/purl.cover.jsp?purl=/1061498/

COUPLING IN SILICO MICROBIAL MODELS WITH REACTIVE TRANSPORT MODELS TO PREDICT THE FATE OF CONTAMINANTS IN THE SUBSURFACE

Lovley, D.R.
DOE/ER/64367-1, 5 pp, Oct 2012

This project successfully accomplished its goal of coupling genome-scale metabolic models with hydrological and geochemical models to predict the activity of subsurface microorganisms during uranium bioremediation. The modeling approach can be used to develop new strategies to optimize bioremediation. The approach of coupling genome-scale metabolic models with reactive transport modeling is sufficiently well established that it has been adopted by other investigators studying uranium bioremediation. The basic principles developed during these studies will be applicable to much broader investigations of microbial activities, not only for other types of bioremediation, but for microbial metabolism in a diversity of environments http://www.osti.gov/servlets/purl/1053957/

TREATABILITY TEST REPORT: CHARACTERIZATION OF VADOSE ZONE CARBON TETRACHLORIDE SOURCE STRENGTH USING TOMOGRAPHIC METHODS AT THE 216-Z-9 SITE

Truex, M.J., K.C. Carroll, V.J. Rohay, R.D. Mackley, and K.R. Parker.
PNNL-21326, 77 pp, Sep 2012

A treatability test was conducted in 2011 at the 216-Z-9 Trench to evaluate methods for collecting characterization information that supports refined assessment of soil vapor extraction (SVE) performance goals based on impact to groundwater. The characterization information can also provide input to operational strategies for continued SVE operation and decisions regarding closure of the SVE system or transition to other remedies. http://0-www.osti.gov.iii-server.ualr.edu/bridge/purl.cover.jsp?purl=/1053738/

USE OF PHYTOREMEDIATION FOR BOTH MANAGING SELENIUM AND PRODUCING BIOFORTIFIED PLANT PRODUCTS AND BIOFUEL UNDER ADVERSE SOIL CONDITIONS

Banuelos, G.S.
2012 Taipei International Conference on Remediation and Management of Soil and Ground Water Contaminated Sites, October 30-31, 2012, Taipei, Taiwan. 361-366, 2012

This paper discusses the production of selenium-biofortified plant products and biofuel from plants grown for the remediation of selenium under field conditions in the San Joaquin Valley, California. [*The paper begins on* ***page 361*** *in the portion of the proceedings (pages 301-422) that opens at the link.*] http://sgw.epa.gov.tw/resag/Update_Data/Information9055749Oct_30-31_Proceedings_1106_1230_Brief_S5-6.pdf

VERIFYING FOOD WEB BIOACCUMULATION MODELS BY TRACKING FISH EXPOSURE AND CONTAMINANT UPTAKE

Gustavson, K. Strategic Environmental Research and Development Program (SERDP), Project ER-1749, 50 pp, 2012

The overall project objective was to develop and use innovative technologies that eliminate fundamental uncertainties in food-web modeling by unambiguously documenting contaminant exposure, chemical uptake, and growth over time in individual fish, and to use that information to verify and improve food-web bioaccumulation modeling approaches. An initial prototype was developed to initiate testing and to assess if the device requirements of tracking and surface recovery of implanted fish were met. Substantial progress was made toward developing a reliable and functioning tag design capable of achieving design requirements, but the flotation mechanism requires modification and the coupled flotation/euthanization mechanism needs to be verified in further prototype development and testing.
http://www.serdp-estcp.org/content/download/15761/180714/file/ER-1749-FR.pdf

General News

VAPOR INTRUSION PUBLIC PARTICIPATION ADVISORY

California EPA, Department of Toxic Substances Control, 109 pp, Mar 2012

This Advisory describes public participation approaches designed to facilitate effective communication and coordination with communities and stakeholders affected by or concerned with vapor intrusion at sites that have a potentially complete indoor air exposure pathway http://www.dtsc.ca.gov/SiteCleanup/upload/VIPPA_Final_03_05_12.pdf

MERCURY CONTAMINATED SITES: SUMMARY REPORT, NICOLE TECHNICAL MEETING

Blom, M. (compiler).
NICOLE Mercury Working Group, 32 pp, 2012

Across the European Union, mercury is listed as a priority hazardous substance, and its use is being largely phased out. The technical workshop on mercury-contaminated sites of 4 December 2012, in Brussels, Belgium, was held to identify and disseminate state-of-the-art strategies, techniques, and technologies that support the management of Hg-contaminated sites while minimizing risk and maximizing sustainability. This report summarizes the workshop presentations and discussions. http://www.nicole.org/uploadedfiles/nicole-brussels-december2012.pdf

SUMMARY OF TECHNICAL IMPRACTICABILITY WAIVERS AT NATIONAL PRIORITIES LIST SITES

U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response.
OSWER Directive 9230.2-24, 101 pp, Aug 2012

Technical impracticability (TI) waivers are one of the means of waiving applicable or relevant and appropriate requirements (ARARs), consistent with CERCLA Section 121(b) and the National Contingency Plan. Through analysis of site data and demonstration of the technical impracticability of achieving those ARARs (e.g., maximum contaminant levels or other federal or state standards), a waiver may be appropriate. This report compiles historical information on 91 TI waivers that were approved for either groundwater or surface water at 85 Superfund sites between 1988 and 2011. Appendix A contains a summary sheet for each TI waiver.
http://www.epa.gov/superfund/health/conmedia/gwdocs/pdfs/TI_waiver_report%2009Aug2012.pdf

TRANSITION ISSUES ANALYSIS

Association of State and Territorial Solid Waste Management Officials, ASTSWMO Removal Action Focus Group, 22 pp, 2013

With assistance from EPA's Office of Emergency Management, ASTSWMO prepared this document as a quick reference for states to better understand EPA-led removal actions. This guide defines the different types of removal actions and lists milestone phases and typical documents generated. Removal action criteria and general roles are supported by corresponding references. The information highlights the dilemma facing some states as to whether to conduct removal actions to address the more immediate risks posed by sites while potentially jeopardizing the ability to secure funding to address long-term remedial actions.
http://www.astswmo.org/Files/Policies_and_Publications/CERCLA_and_Brownfields/Removals-Transition_Issues_Analysis/2013-03-01-Transitions_Research_Document-3-06-12.pdf
Supporting information includes the "Emergency Response Matrix" (.xls), "Non-TCRA Matrix" (.xls), "TCRA Matrix" (.xls), and "Removal Action Process Timeline Schematic" (.ppt), at
http://www.astswmo.org/Pages/Policies_and_Publications/CERCLA_and_Brownfields.htm

ADVISORY: ACTIVE SOIL GAS INVESTIGATIONS

California EPA, Department of Toxic Substances Control, 96 pp, Apr 2012

This updated Advisory provides technically consistent approaches for collecting and analyzing soil gas samples. Data obtained from soil gas investigations can be used to identify the spatial distribution of volatile contamination at a site and assist in the evaluation of vapor intrusion. This 2012 revision incorporates all key elements from the Los Angeles Regional Water Quality Control Board's 1997 *Interim Guidance for Active Soil Gas Investigation* and is a compilation of available information, knowledge, experience and best practices regarding soil gas sampling.
http://www.dtsc.ca.gov/SiteCleanup/upload/VI_ActiveSoilGasAdvisory_FINAL043012.pdf
See also the 3-page "Summary of Changes Between 2003 Advisory and 2012 Advisory" at http://www.dtsc.ca.gov/SiteCleanup/upload/VI_ASGI_summary_of_changes_FINAL.pdf

PETROLEUM BROWNFIELDS 2013: OPPORTUNITIES FOR ACTION

U.S. EPA, Offices of Underground Storage Tanks (OUST) and Brownfields and Land Revitalization (OBLR), 9 pp, Feb 2013

In 2008, OUST and OBLR jointly developed a petroleum brownfields action plan to identify objectives and resources that specifically targeted petroleum-contaminated properties. This 2013 action plan describes challenges associated with cleaning up and reusing petroleum brownfields, highlights EPA accomplishments achieved since 2008, and proposes petroleum brownfields actions EPA intends to achieve over the next three years http://www.epa.gov/oust/pubs/petrobfactionplan.htm

FEDERAL ACTIONS TO ADDRESS IMPACTS OF URANIUM CONTAMINATION IN THE NAVAJO NATION: FIVE-YEAR PLAN SUMMARY REPORT

U.S. EPA Region 9, 67 pp, 2013

In 2007, five federal agencies developed a five-year plan that outlined a strategy for addressing the most urgent risks posed by legacy uranium contamination on the lands of the Navajo Nation, an area of roughly 27,000 square miles. As the five-year period ended in 2012, U.S. EPA and partner agencies (the Bureau of Indian Affairs, Nuclear Regulatory Commission, Department of Energy, and Indian Health Service) prepared this report to describe the progress made toward cleaning up uranium-contaminated soil and groundwater at specific sites on the reservation between 2008 and 2012. Much remains to be done, and all five agencies have committed to developing another five-year plan to continue the work http://epa.gov/region9/superfund/navajo-nation/pdf/NavajoUraniumReport2013.pdf

The Technology Innovation News Survey welcomes your comments and suggestions, as well as information about errors for correction. Please contact Michael Adam of the U.S. EPA Office of Superfund Remediation and Technology Innovation at adam.michael@epa.gov or (703) 603-9915 with any comments, suggestions, or corrections.

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