

Technology Innovation News Survey

Entries for June 1-15, 2015

Market/Commercialization Information

SOURCES SOUGHT FOR REMOVAL ACTION AT THE QUIVIRA MINE
U.S. Environmental Protection Agency, Region IX, San Francisco, CA.
Federal Business Opportunities, FBO-4977, Solicitation SOL-R9-15-00012, 2015

EPA Region 9 seeks to determine the availability of qualified companies capable of meeting the Government's technical requirement for removal action at the abandoned Quivira uranium mines on the Navajo Reservation, located between Thoreau and Gallup in New Mexico. Three vent holes for the subsurface workings are accessible by the community, and radium-226 contamination of soil at each vent hole extends ~0.5 acre, with typical concentrations in the range of 4-10 pCi/g and one small waste pile with a maximum detection of 360 pCi/g. Capability responses to this notice must be submitted electronically via FedConnect at <https://www.fedconnect.net/FedConnect/2740caP156501487388666caPFDL> or before 3:30 PM PT, July 29, 2015. While the Government will not respond directly to comments or suggestions concerning the scope of work, EPA will consider them in determining the method of acquisition and finalizing any future solicitation. <https://www.fbo.gov/spg/EPA/OAM/ReqIX/SOL-R9-15-00012/listing.html>

CLIFF PARK GROUNDWATER REMEDIATION

Department of the Interior, National Park Service, Philadelphia, PA.
Federal Business Opportunities, FBO-4976, Solicitation P15P501873, 2015

The National Park Service, Delaware Water Gap National Recreation Area, intends to issue a Request for Quotations for Groundwater Remediation Services at Cliff Park, Delaware Water Gap National Recreation Area, Bushkill, Pennsylvania. This project will be a total small business set-aside, NAICS code 562910, with a small business size standard of 500 employees. The magnitude of construction for this project is between \$100,000 and \$250,000. A single firm-fixed-price construction contract will be awarded as a result of the solicitation, which will be issued on or about August 1, 2015, as an RFQ on FedConnect at <https://www.fedconnect.net/FedConnect/2740caP156501487388666caPFDL> with a response date 30 days thereafter. For additional information, see the 2012 solicitation for removal of underground storage tanks at this site: <https://www.fbo.gov/spg/DOI/NPS/ABC-15/15P5011097/listing.html>

GROUNDWATER MONITORING AND MODELING

NIHHS, National Institutes of Health, Bethesda, MD.
Federal Business Opportunities, FBO-4978, Solicitation NIHOF2015072, 2015

The NIH Office of Acquisitions at the Rocky Mountain Laboratories plans to issue a solicitation notice (release date unspecified) for groundwater monitoring as part of work to be performed in Ravalli County, Montana, for the National Institutes of Health, located at 303 South 4th Street, Hamilton, Montana. NIH intends to award a firm-fixed-price contract for a base year and two yearly option periods. <https://www.fbo.gov/spg/HHS/NIH/ORS/NIHOF2015072/listing.html> For a description of the site, groundwater contaminants, and other information, see the attachments to the NIH 2010 solicitation for groundwater monitoring, modeling, and reporting at <https://www.fbo.gov/spg/HHS/NIH/ORS/NIHOF2010283/listing.html>

Cleanup News

EVIDENCE OF SEPARATED DNAPL STORAGE AND TRANSPORT ZONES IN WEATHERED AND FRACTURED CRYSTALLINE ROCK

Cobb, H., G. Galy, G. Henish, and J. Paterson.
MGP Conference 2015, Providence, Rhode Island, 14-17 April 2015, 22 slides, 2015

DNAPL recovery wells completed in fractured metamorphic rock at a site in Georgia have recovered an estimated 50,000 gal of DNAPL in the last 12 years of operation, a volume of DNAPL equivalent to roughly three times the total fracture porosity of the affected volume of rock. This volume imbalance, and the long-term consistency of recovery rates, point to the existence of DNAPL storage zones above the fractured rock. A zone of partially weathered rock (PWR) above the less weathered and fractured bedrock surface, is interpreted to store isolated pools of DNAPL in irregular depressions. The linkage of DNAPL storage in the PWR to transport in underlying bedrock fractures is supported by the persistent DNAPL recovery in the bedrock that directly underlies the historical release zones, and by data from extensive investigations, including NAPL FLUTE and FLUTE transmissivity profiling, video logging, borehole-geophysics, and pumping tests. Data from these complementary techniques strengthen the site conceptual model, particularly with respect to the occurrence of mobile DNAPL within fractures where current and future recovery could be optimized. While field evidence and hydraulic aperture calculations suggest that DNAPL penetrates fractures of even relatively low transmissivity, DNAPL recovery is predominately from the relatively higher transmissivity fractures observed in shallow bedrock. See **PDF pages 1-22** at <http://www.mgpconference.com/wp/wp-content/uploads/2014/03/Session-6-DNAPL-Assessment-and-Recovery.pdf>

PASSIVE DNAPL COLLECTION GALLERY DESIGN, CONSTRUCTION, PERFORMANCE, AND LESSONS LEARNED

Fischer, T.J., D.G. Bessingpas, D.J. Carpenter, E. Rogoff, and W.W. Thompson.
MGP Conference 2015, Providence, Rhode Island, 14-17 April 2015, 20 slides, 2015

The first stage of a coal tar DNAPL recovery program was implemented at NorthWestern Energy's former manufactured gas plant site located in Aberdeen, South Dakota. Carefully designed porous media trenches (collection galleries) were constructed, using DeWind's Permeable Trenching system to excavate subsurface soil to as much as 40 ft bgs, install 6-in-diameter slotted collection pipes on the trench bottoms, and backfill the trenches with a granular material that supports the sides of the 2-ft-wide excavations. The bases of the collection galleries have a nominal 3% slope to allow the DNAPL to flow through the collection pipe and pool within a sump structure positioned at one end of each collection gallery. Positioning of the collection galleries was based on a 3D model of the subsurface geology and morphology of the identified coal tar DNAPL bodies, as established using soil borings, TransGOST[®], cone penetrometer, and product recovery wells. About 3,700 gal of coal tar DNAPL have been recovered from the five subsurface collection galleries (totaling 1,194 ft in length) in a 3-yr period. See a paper about this project at <http://client.cfrch.com/2pages&action=download&file=132>, and also see **PDF pages 23-42** in the slides at <http://www.mgpconference.com/wp/wp-content/uploads/2014/03/Session-6-DNAPL-Assessment-and-Recovery.pdf>

COMPLEX SOIL REMOVAL AND FREE PRODUCT RECOVERY SYSTEM INSTALLATION AT AN ACTIVE UTILITY SERVICE CENTER

Wuellner-Rice, S., C. Kozyrski, J. Nelson, M. Chase, M. Gardner, and M. McCabe.
MGP Conference 2015, Providence, Rhode Island, 14-17 April 2015, 25 slides, 2015

A multi-faceted remediation was implemented at an active utility service center and maintenance yard. Surface and subsurface soils were removed using traditional excavation methods. Free product was identified in an area of limited access, immediately adjacent to a vacant office building (earmarked for possible future use) in an area that included a corridor of vital operational communication utilities. The 16 ft deep excavation area required special support measures, including isolation and protection of underground utilities; construction of an H-pile lagging/bracing system to provide structural support for the building during excavation; and implementation of a vibration monitoring plan, including pre- and post-construction building inspections and daily surveys of exterior building control points, to ensure the building experienced no shift or movement. More than 720 loads totaling 16,900 tons of impacted material were removed from the site. Significant structural impediments, including the office building, precluded the removal of all source material. To mitigate future free product migration, a product recovery trench and well were installed along the southern and western perimeters of the deep excavation. See **PDF pages 43-67** at <http://www.mgpconference.com/wp/wp-content/uploads/2014/03/Session-6-DNAPL-Assessment-and-Recovery.pdf>

SUCCESS WITH SOIL VAPOR EXTRACTION, 200-PW-1 OPERABLE UNIT, HANFORD SITE, RICHLAND, WA

Byrnes, M., V. Rohay, S. Simmons, J. Morse, G. Sinton, and E. Laija.
WM2014 Conference, March 2-6, 2014, Phoenix, Arizona, Paper 14017, 6 pp, 2014

Several sites within the 200 West Area of DOE's Hanford facility were used from 1955-1973 for soil column disposal of liquid wastes containing carbon tetrachloride. From 1992 through 2012, SVE operations recovered 176,604 lb of CT from the vadose zone at 200 West Area Operable Unit, which includes the CT waste sites, identified a final cleanup level of 100 ppmv for CT in soil vapor and specified that soil vapor concentrations will be further refined and assessed to ensure groundwater protection. Given that soil vapor concentrations in all of the SVE wells were below the 100 ppmv cleanup level, SVE was not performed in 2013. CT concentrations will be re-evaluated in 2014, and a decision will be made at that time whether to continue SVE operations. <http://www.wmsvm.org/archives/2014/papers/14017.pdf>

Demonstrations / Feasibility Studies

B&L WOODWASTE SITE, PIERCE COUNTY, WASHINGTON: PHASE 2 IN SITU PILOT STUDY MONITORING REPORT

Washington Department of Ecology, 95 pp, 2014

At the B&L Woodwaste Landfill, the remedial action for the wetlands cleanup action area utilizes a combination of technologies to address arsenic concentrations of 500 µg/L or higher. Following reduction of the arsenic mass via pump and treat and successful demonstration of treatment of residual arsenic at pilot scale, in situ denitrification precipitation will be utilized to achieve site cleanup levels in areas where arsenic contamination persists. Currently, Phase 2 pilot-scale denitrification precipitation permeable reactive barriers (PRBs) are intercepting contaminated groundwater at the leading edges of the site's arsenic plume following a successful Phase 1 pilot demonstration. Phase 2 includes assessment of the effectiveness of treatment options in four representative treatment cell zones, EHC-M[™] in cells A and B, and a custom amendment of sugar substrate, sulfate salts, and pH buffer dissolved in water and injected as a liquid in cells C and D. Results from Year 2 monitoring demonstrate the relative effectiveness of the amendments and the dosages for plume area treatment and provide data for evaluation of treatment permanence and maintenance requirements. <https://fdmstr.wa.gov/ev/gsp/DocViewer.aspx?doc=27200>

INTERIM WATER TREATMENT AT THE FARO MINE, YUKON, CANADA: THE 10-YEAR PLAN

Stefanoff, J. and K. Furlong. SME Annual Conference & Expo -- CMA 117th National Western Mining Conference, 15-18 February 2015, Denver, Colorado. Abstracts, p 233, 2015

Reclamation and water treatment is underway at the now-closed Faro Mine in Yukon, Canada. This open pit mining complex operated between 1969 and 1998 and was once one of the largest lead-zinc projects in the world. To meet regulatory requirements, the mine wastewater must be treated to reduce high concentrations of Al, Cd, Cu, Pb, Ni, and Zn. While long-term water treatment is to be conducted using a 44 ML/day (6,100 ppm) high-density sludge process, that system will not be operational for about 10 years, necessitating an interim system. The interim 33 ML/day (6,000 ppm) system consists of two parallel trains of prefabricated skid-mounted equipment utilizing lime neutralization, resulting in alkali precipitation of metals, followed by sand-ballasted clarification. The system is housed within a fabric building that provides an economical means to withstand the harsh northern environment. See the Faro Mine Remediation Project website for background information: <http://www.faromine.ca/>

SUSTAINABLE IN-WELL VAPOR STRIPPING: A DESIGN, ANALYTICAL MODEL, AND PILOT STUDY FOR GROUNDWATER REMEDIATION

Sutton, P.T. and T. Ginn.
Journal of Contaminant Hydrology, Vol 171, 32-41, 2014

The design of a sustainable in-well vapor stripping system for remediation of shallow chlorinated solvent groundwater plumes is based on a solar-powered air compressor that injects air bubbles into a monitoring well to strip out VOCs while simultaneously inducing groundwater circulation around the well screen. An analytical model developed to estimate contaminant mass flow and removal rates was calibrated based on a one-day pilot study conducted in an existing monitoring well at a former dry cleaning site. According to the model, induced groundwater circulation at the study site increased the contaminant mass flow rate into the well by roughly two orders of magnitude relative to ambient conditions. Modeled estimates for 5 hr/day of pulsed air injection at the site indicated that the average effluent concentrations of dissolved PCE and TCE can be reduced by ~90% relative to the ambient concentrations. The system could be used cost-effectively as either a single- or multi-well-point technology for substantial reduction of dissolved chlorinated solvent mass in groundwater. See details of the solar-powered system in P.T. Sutton's 2013 Master's thesis: <http://gradworks.umi.com/1453371.pdf>

IN SITU BIOSTIMULATION OF PETROLEUM HYDROCARBON DEGRADATION BY NITRATE AND PHOSPHATE INJECTION USING A DIPOLE WELL CONFIGURATION

Ponsifi, V., B. Coulomb, Y. Guérollet, J. Maier, and P. Hoehener.
Journal of Contaminant Hydrology, Vol 171, 22-34, 2014

In a field feasibility study of source zone bioremediation by nitrate and nutrient injection, groundwater from a crude-oil contaminated aquifer was pumped from a downgradient well at a rate of 2.5 m³/hr; enriched with bromide (tracer), nitrate, and ammonium phosphate; and injected in a well 40 m upgradient. The test was run for 49 days with solute injection, followed by 65 days of recirculating well dipole operation without solute addition. The resulting bromide breakthrough curve allowed quantifying a first-order leakage coefficient of 0.017/day from the dipole, while a first-order nitrate consumption rate of 0.075/day was determined from the nitrate data. Dissolved hydrocarbon concentrations including benzene decreased to nondetect in 84 days but rebounded after circulation ended. Nitrate accumulated temporarily but was consumed entirely when solute injection stopped. Mass balance calculations revealed that ~63% of the nitrate was used for hydrocarbon degradation, with the remaining used for oxidation of reduced sulfur. Delineation of the treated zone in a reactive transport model suggested that denitrification influenced flow and transport in the dipole.

IN SITU PRECIPITATION OF RADIONUCLIDES IN GROUNDWATER AT U.S. DOE SAVANNAH RIVER SITE

Lutes, C., A. Fritzell, J. Gillow, and J. Beckner.
WM2014 Conference, March 2-6, 2014, Phoenix, Arizona. Paper 14559, 14 pp, 2014

A field demonstration of enhanced anaerobic reductive precipitation, enhanced reductive dechlorination, and enhanced denitrification for a mixed-waste plume containing isotopes of uranium, technetium, and other radionuclides was conducted at DOE's Savannah River site. The field project established geochemical zones ranging from aerobic to methanogenic in a plume pattern emanating from a line of molasses injection wells. Eighteen months after the last reagent injection, the reactive zone gradually rebounded to ambient, less reducing conditions. Groundwater data showed decreases in concentrations of U-233/234, U-238, Tc-99, nitrate, and Sr-90 to below treatment targets. Monitoring results 30 months after the end of active treatment show continued precipitate stability. <http://www.wmsvm.org/archives/2014/papers/14559.pdf>

Research

STUDY TO IDENTIFY BATEA FOR THE MANAGEMENT AND CONTROL OF EFFLUENT QUALITY FROM MINES

Pou, K., K. Campbell, and L. Babel.
Mine Environment Neutral Drainage Program, MEND Report 3.50.1, 555 pp, 2014

This report identifies effluent treatment technologies that could be considered best available technologies (BAT) for the Canadian mining sector. The technologies were compiled from treatment technologies currently available on the market, both active and passive, that are applicable to the control of effluent quality. Potential BAT technologies were screened against three criteria: (1) Can this technique achieve current metal mining effluent regulations discharge limits? (2) Has this technique been demonstrated at scale on mining effluent? (3) Has this technique been demonstrated under representative climate conditions? Technologies that satisfied all three criteria were carried forward for consideration as BATEA (best available technologies economically achievable). A technical characterization is presented for each BAT that describes contaminant removal mechanisms, removal efficiencies and/or achievable concentrations, major equipment, synergies with other technologies, operational challenges, current application at Canadian operations, and capital and operating costs. http://mend.nrdm.org/wp-content/uploads/MEND_3.50.1_BATEA.pdf

ROLE OF NITRATE IN THE REMEDIATION AND ATTENUATION OF SELENIUM IN COAL MINE WASTEWATER

Dockrey, J., A. Martin, J. Stockwell, C. Kennedy, and B. Day.
Mine Environment Neutral Drainage Program, MEND Report 10.3, 212 pp, 2015

Results of a literature review and drainage chemistry analysis from eight mine sites in British Columbia suggest that nitrate has the potential to influence selenium behavior in coal mine environments, although the scale and magnitude of such influences are unclear. With regard to the inhibition of Se reduction, the presence of nitrate may be a rate-limiting variable, which is relevant to both passive and active treatment systems. The role of nitrate as an oxidizer of reduced Se and S is less clear; however, the prerequisite conditions for this process to operate (sboxia combined with nitrate availability) are present for the majority of waste facilities examined. <http://mend-nedem.org/wp-content/uploads/10-3-Role-of-Nitrate-Se-1.pdf>

NITRATE ADDITION TO GROUNDWATER IMPACTED BY ETHANOL-BLENDED FUEL ACCELERATES ETHANOL REMOVAL AND MITIGATES THE ASSOCIATED METABOLIC FLUX DILUTION AND INHIBITION OF BTEX BIODEGRADATION

Corseuil, H.X., D. E. Gomez, C.M. Schambeck, D.T. Ramos, and P.J.J. Alvarez.
Journal of Contaminant Hydrology, Vol 174, 1-9, 2015

A comparison of two controlled ethanol-blended fuel releases under natural attenuation (NA) versus nitrate biostimulation (NB) illustrates the potential benefits of augmenting the electron acceptor pool with nitrate to accelerate ethanol removal and thus mitigate its inhibitory effects on BTEX biodegradation. Ethanol removal was faster in the nitrate-amended plot (1.4 years) than under NA conditions (3.0 years), which led to faster BTEX degradation. An abundant substrate (ethanol) can dilute the metabolic flux of target pollutants (BTEX) whose biodegradation rate eventually increases after ethanol is preferentially consumed. Simulation results suggest that the initial focus of cleanup efforts (after free-product recovery) should be to stimulate the degradation of ethanol (e.g., by nitrate addition) to decrease its fraction in the mixture and speed up BTEX biodegradation. <http://alvarez-blogs.rice.edu/files/2015/04/2015.pdf>

IN SITU IMMOBILIZATION OF SELENIUM IN SEDIMENT

Moore, R. and T. Stewart. SAND2014-17780R, LDRD Project Number 176039, 18 pp, 2014

This project focused on the use of a sorbent, carbonated apatite, to immobilize selenium in the environment (e.g., carbonated apatite as a sorbent in a permeable reactive barrier). The literature contains little data on selenium sorption by carbonated apatite. In this work, carbonated apatite was synthesized by a precipitation method and characterized. Batch selenium kinetic and equilibrium experiments were performed. The carbonated apatite contained 9.4% carbonate, and uptake of selenium as selenite was rapid: 5 hours for complete uptake of selenium versus more than 100 hours for pure hydroxyapatite as reported in the literature. Additionally, the carbonated apatite exhibited significantly higher distribution coefficients in equilibrium experiments than pure apatite under similar experimental conditions. The goal is to demonstrate the technology in a field application. <http://www.nsl.gov/scitech/hbibin/1171587>

INNOVATIVE TREATMENT OF PROBLEMATIC (ORPHAN) AND OTHER ORGANIC WASTES: AN EXCELLENT EXAMPLE OF INTERNATIONAL TECHNOLOGY TRANSFER BETWEEN THE US AND THE UK

Cont-Rasmussen, D., M. Lodge, J. D. Tait, R. Elmer, A. G. H. Judd, J. Ritter, R. Grondin, and T. Yarbrough.
WM2014 Conference, 2-6 March 2014, Phoenix, Arizona. Paper 14119, 17 pp, 2014

The Arvia Organics Destruction Process was deployed at a Magnox site in the UK to treat radioactively contaminated oil. This paper describes the Arvia process and discusses recent DOE-funded efforts with a vendor/contractor consortium to demonstrate the Arvia process in the United States on waste streams such as dioxins, furans, and PCB-laden oils, which cannot be treated readily using incineration. Following optimization of the treatment parameters, active wastes from DOE's Oak Ridge, Tenn., facility will be used in active testing trials. The Arvia Organics Destruction Process is based on a patented material, Nyex™, which combines adsorption of organics with electrochemical oxidation to convert organic materials to carbon dioxide and water at ambient temperature while partitioning radioactive and inorganic constituents into an aqueous stream that can be treated by a local effluent treatment plant. The Nyex acts as a catalytic agent and is regenerated during the process. <http://www.wmsvm.org/archives/2014/papers/44119.pdf>

LOW LEVEL QUANTIFICATION OF 1,4-DIOXANE AND INVESTIGATION OF 1,4-DIOXANE CO-METABOLISM BY MYCOBACTERIUM SP. 1A

McKeage, Kevin J., Master's thesis, Oregon State University, 90 pp, 2015

A method of analyzing environmentally relevant concentrations of 1,4-dioxane in the sub-µg/L range by heated purge-and-trap coupled with GCMS demonstrates a method detection limit of 0.13 µg/L. Detection at this level enabled the characterization of the 1,4-dioxane degradation capabilities of an Actinomycete culture, *Mycobacterium* sp. 1A (1A), which was found to degrade dioxane at rates two to four times faster in the absence of propane than in the presence of propane. Although propane did inhibit dioxane transformation, the compound was still observed to be completely transformed in its presence. <https://ir.library.oregonstate.edu/xmlui/bitstream/handle/1937/56738/McKeageKevin12015.pdf?sequence=3>

HIGHLY PARAMETERIZED INVERSION OF GROUNDWATER REACTIVE TRANSPORT FOR A COMPLEX FIELD SITE

Carniato, L., G. Schoups, N. van de Giesen, P. Seuntjens, L. Bastiaens, and H. Sapin.
Journal of Contaminant Hydrology, Vol 173, 38-58, 2015

In addition to advective-dispersive transport, a numerical groundwater reactive transport model of a shallow groundwater aquifer contaminated with VOCs includes contaminant release from source areas, natural attenuation, abiotic degradation by a permeable reactive barrier (PRB), and dilution by infiltrating rain. Aquifer heterogeneity is parameterized using pilot points for hydraulic conductivity, specific yield, and groundwater recharge. The proposed methodology relies on pilot-point parameterization of hydraulic parameters and groundwater remediation, a regularization procedure to reconcile the large number of spatially distributed parameters with the limited field data, a step-wise approach for integrating the different data sets into the model, and high-performance computing. Results indicate that the PRB is expected to remain effective at degrading groundwater contamination until at least 2035, although existing contamination downstream of the PRB likely will persist beyond 2035 due to the small dilution effect of infiltrating rain and the site's low biodegradation rates. See details in Chapter 7 of L. Carniato's 2014 Ph.D. dissertation: http://repository.hydro.uzh.ch/handle/10150/333041/1/azu.pdf.13531_sip1_m.pdf

USING VAPOR PHASE TOMOGRAPHY TO MEASURE THE SPATIAL DISTRIBUTION OF VAPOR CONCENTRATIONS AND FLUX FOR VADOSE-ZONE VOC SOURCES

Mainhagu, J., C. Morrison, and M.L. Brusseau.
Journal of Contaminant Hydrology, Vols 177-178, 54-63, 2015

A soil vapor extraction (SVE) system has operated since 2007 at a site affected by chlorinated solvents in Tucson, Arizona. In an evaluation of the effectiveness of vapor-phase tomography for characterizing VOC distribution in the site's vadose zone, vapor concentration and vacuum pressure were measured at four depths in each of the four monitoring wells surrounding the extraction well. The test provided 3D characterization of local vapor concentrations under induced-gradient conditions. Permeability data obtained from analysis of borehole logs were used with pressure and the vapor-concentration data to determine VOC mass flux within the test domain. A region of higher mass flux was identified in the deepest interval of the S-SW section of the domain, indicating the possible location of a zone with greater contaminant mass consistent with the TCE-concentration distribution obtained from sediment coring conducted at the site. For additional information on this study, see C.N. Morrison's 2014 Ph.D. dissertation: http://arizona.openrepository.com/arizona/bitstream/10150/333041/1/azu.pdf.13531_sip1_m.pdf

INFILTRATION AND EVAPORATION OF SMALL HYDROCARBON SPILLS AT GAS STATIONS

Hilpert, M. and P.N. Breyse. Journal of Contaminant Hydrology, Vol 170, 39-52,

Small gasoline spills frequently occur where fuel is dispensed. This paper presents a mathematical model for estimating both the amount of gasoline that infiltrates the concrete beneath the dispensing stations and the amount of gasoline that evaporates into the atmosphere. The model shows that the fraction of infiltrated gasoline can exceed the fraction that evaporates from the sessile droplets. Infiltrated gasoline then evaporates and is slowly released to the atmosphere via slow diffusive transport in pores. Study results suggest that over the lifespan of a gas station, concrete pads beneath fuel dispensing areas accumulate significant amounts of gasoline, which could eventually break through into underlying soil and groundwater. The model also shows that lifetimes of spilled gasoline droplets on concrete surfaces are on the order of minutes or longer, thus contamination can be carried away by foot traffic or precipitation runoff. Regulations and guidelines typically do not address subsurface and surface contaminations due to chronic small gasoline spills, although these spills could result in nonnegligible human exposure to toxic and carcinogenic gasoline compounds.

EVALUATION OF SURFACTANT FLUSHING FOR REMEDIATING EDC-TAR CONTAMINATION

Lang, C., and C. Hsieh.
Journal of Contaminant Hydrology, Vols 177-178, 158-166, 2015

Ethylene dichloride tar (EDC-tar) is a DNAPL waste originating from the process of vinyl chloride production. Major EDC-tar constituents include chlorinated aliphatic and aromatic hydrocarbons. A feasibility study of the use of surfactant-enhanced aquifer remediation (SEAR) for treating an EDC-tar contaminated aquifer explored the potential of single or mixed surfactants to enhance the apparent solubility of EDC-tar. An aqueous solution of mixed anionic and non-ionic surfactants (i.e., SDS/Tween 80) exhibited higher EDC-tar apparent solubility and lower surface tension than other surfactant systems tested. Additionally, alkaline pH aids in increasing EDC-tar apparent solubility. Separation of EDC-tar in the surfactant solution was conducted employing a salting-out effect. Significant separation of DNAPL was observed when 13 wt% or more NaCl was added to the solution.

IN SITU AEROBIC COMETABOLISM OF CHLORINATED SOLVENTS: A REVIEW

Frasconi, D., G. Zanardi, and A.S. Danilo.
Journal of Hazardous Materials, Vol 283, 382-399, 2015

The studies reviewed in this paper indicate that in situ aerobic cometabolism leads to the biodegradation of a wide range of chlorinated solvents within remediation times that vary between one and 17 months. Many of the studies included a simulation based on the field data. Modeling of the cometabolism process has attained a high reliability and represents a crucial tool for the elaboration of field data obtained in pilot tests and for the design of the full-scale systems. Current needs include methods of engineering higher concentrations of chlorinated solvent-degrading microbes and more reliable cost estimates. Additionally, the authors propose a procedure for the design of full-scale in situ aerobic cometabolic bioremediation processes.

General News

NETWORKING WITH TECHNICAL, SCIENTIFIC AND END-USER COMMUNITY

Wendler, K.
DECHEMA e.V., 293 pp, 2014

This publication introduces the activities that were conducted to spread information about the developments within the HOMBRE innovative environmental management project. The HOMBRE partners actively disseminated information in related networks and through presentations and workshops during scientific and end-user-oriented symposia. The main event that gave an overview of project results was CABERNET 2014: Tailored & Sustainable Redevelopment toward Zero Brownfields at the 4th International Conference on Managing Urban Land, which was held 14-16 October 2014 in Frankfurt am Main. The first half of the PDF file contains project materials presented at CABERNET 2014, and the latter half contains e-learning module presentations that introduce the different tools contained in the Brownfield Navigator. http://www.zem-brownfield.eu/Hombre/TrainingGallery/HfMRBE_P7_2_v1_D_all.pdf

HUMAN HEALTH RISK ASSESSMENT GUIDANCE

U.S. Navy, NAVFAC, 154 pp, Dec 2008, revised Sep 2014

This reference identifies a three-tiered risk assessment approach used by the U.S. Navy to evaluate sites in the Environmental Restoration Program. The tiered approach incorporates risk management into the decision-making process, minimizes the level of effort, and eliminates sites that are not of concern. https://www.navy.mil/content/dam/naVFAC/Speciaity%20Centers/Engineering%20and%20Expeditionary%20Warfare%20Center/Environmental%20Restoration/tar_pdfs/gpr/navy-ev-guid-hhra-2008012r.pdf

RISK EVALUATIONS DIFFER DEPENDING UPON AGENCY PERFORMING THEM: IMPLICATIONS FOR DOE

Burger, J., M. Gochfeld, C. Powers, and D. Kosson.
WM2014 Conference, 2-6 March 2014, Phoenix, Arizona. Paper 14139, 19 pp, 2014

Different agencies use varying assumptions and methods to perform risk assessments for contaminants affecting human and ecological health. Two risk assessment case studies from the DOE complex — set at the Oak Ridge Reservation and Brookhaven National Laboratory — illustrate how risk evaluations can differ in objectives, scope, methods, assumptions, audience, and conclusions. Both deal with the risks from mercury. Risk evaluations play an important role in environmental management, remediation, and restoration, yet when different agencies and groups evaluate risk, the objectives and methods may differ, leading to different conclusions, which can confuse managers, policy-makers, and the public. Implications from this study indicate a need to be clear about all objectives, data used, methods, assumptions, and conclusions in delineating risk evaluations and risk assessments. <http://www.wmsvm.org/archives/2014/papers/14139.pdf>

ABSTRACT BOOK, CONTASED2015 — CONTAMINATED SEDIMENTS: ENVIRONMENTAL CHEMISTRY, ECOTOXICOLOGY AND ENGINEERING

Congressi Stefano Francini, Monte Verita, Switzerland, 95 pp, 2015

ContASED2015, held 8-13 March 2015 in Ascona, Switzerland, provided a platform for experts and junior researchers from different scientific disciplines to present recent results and novel approaches to the analysis, assessment, and remediation of contaminated sediment. Topics included sedimentary archives and historical trends; reconstruction of changing pollutant loads into aquatic ecosystems and identification of their drivers; transformation processes and degradation products of sediment contaminants; pore water partitioning of chemicals and bioavailability of hazardous substances and pathogens; role of sediment-water interface processes on biogeochemical pollutant dynamics; and in situ and ex situ contaminated sediment remediation techniques. The conference covered studies about legacy and emerging organic pollutants, heavy metals, microbes, and engineered nanomaterials. http://contased.org/images/docs/AbstractBook_MonteVeritaVersion.pdf

TAKING NANOTECHNOLOGICAL REMEDIATION PROCESSES FROM LAB SCALE TO END USER APPLICATIONS FOR THE RESTORATION OF A CLEAN ENVIRONMENT

Bardos, P., S. Jones, S. Bartke, E. Limasset, and B. Bone.
NanoRem Project, Task IDL 9.4, 119 pp, 2015

This report discusses the "value proposition" for iron nanoparticles and nanoscale zero valent iron (NZVI) in remediation in terms of a risk-benefit appraisal of its use given the current state of knowledge. Scenario analysis is used to explore likely market potential and the factors affecting it over the short, medium, and longer term. An analysis of strengths, weaknesses, opportunities, and threats and how these might change over time has been used to draw some conclusions about the broad actions that might support better exploitation of nanoremediation. http://www.nanorem.eu/Stream.aspx?z=App_Data/docs/user7/Gallery/NanoRem%20D1%209_1-Exploitation%20Strategy%20and%20Consultation-Final.pdf

PROMOTING NANOREMEDIATION USING NANOSCALE ZEROVALENT IRON (NZVI): RISK-BENEFIT AND MARKETS APPRAISAL, INITIAL EXPLOITATION STRATEGY AND CONSULTATION

Bardos, P. and S. Jones, et al.
NanoRem Project, Task DL 9.1, 39 pp, 2015

This summary focuses on nanoscale zero valent iron (NZVI) as the best known and most frequently encountered nanoparticle used for in situ remediation, although the information provided may also be indicative for other nanoparticle types. An outline of risk-benefit appraisal activities is provided, as well as an overview of the NanoRem website and initial outlook on the broad exploitation strategy for NZVI. http://www.nanorem.eu/Stream.aspx?z=App_Data/docs/user7/Gallery/NanoRem%20D1%209_1-Exploitation%20Strategy%20and%20Consultation-Final.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 michael.adam@epa.gov or (703) 603-9915 with any comments, suggestions, or corrections.

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