Technology Innovation News Survey

Entries for May 1-15, 2015

Market/Commercialization Information

10TH STREET REMEDIAL ACTION - PHASE II, COLUMBUS, NEBRASKA

U.S. Environmental Protection Agency, Region VII, Lenexa, KS.
Federal Business Opportunities, FBO-4936, Solicitation SOL-R7-15-00012, 2015

EPA Region 7 plans to seek the services of an experienced small business firm to provide remedial action services for two operable units (OUs). OU1 comprises an area generally south of the Union Pacific rail line that crosses the central portion of Columbus, Nebraska, and includes the southern municipal well field where contamination was originally identified and the former Jackson Services and Liberty Cleaners source areas. OU2 consists of the area north of the rail line to the former One Hour Martinizing dry cleaning facility, now Prestige Dry Cleaning, located over one-half mile north of OU1. The work to be performed under this contract consists of building demolition, excavation, disposal of contaminated soil, backfilling, site restoration, monitoring wells, and in situ chemical injections within a period of performance of 270 calendar days from notice to proceed. Estimated dollar value for this total small business set-aside is between $3M - $8M. Release of the RFP is anticipated sometime in June 2015 on FedBizOpps at https://www.fbo.gov/spg/EPA/OAM/RegVII/SOL-R7-15-00012/listing.html and on FedConnect at https://www.fedconnect.net/FedConnect/?doc=SOL-R7-15-00012&agency=EPA.

PILOT WORK STUDY / FEASIBILITY STUDY REPORT

Department of the Interior, Bureau of Reclamation, Mid-Pacific Region, Sacramento, CA.
Federal Business Opportunities, FBO-4941, Solicitation R15PS00971, 2015

This RFQ is issued as a total small business set-aside under NAICS code 541620, with a size standard of $15M. Services include evaluating the effectiveness of at least three different in situ multimedia technologies (e.g., in situ bioremediation, in situ chemical oxidation, and vapor extraction) for treating both soil and groundwater at the Putah Creek site, and selecting the most feasible technology for a pilot test to verify its effectiveness and implementability in achieving mass removal and biological destruction of TPHg, BTEX, and MTBE. Site-specific bench-scale tests will be conducted to facilitate the alternatives evaluation. If test results are favorable, a Corrective Action Plan with comprehensive cost estimate and anticipated timeline to closure will be developed to address full-scale remediation at the site. Submit quotes by or before 2:00 PM PT on June 26, 2015.
https://www.fbo.gov/notices/04ae8212e8c9be6490094cc5352f970b

ENVIRONMENTAL SERVICES

Department of the Air Force, Air Combat Command, Moody AFB, GA.
Federal Business Opportunities, FBO-4946, Solicitation FA4830-15-Q-0070, 2015

This RFQ is issued as a total small business set-aside, NAICS code 562211, with a small business size standard of $38.5M. The Government anticipates issuing a 5-year (15 July 2015 — 14 July 2020) blanket purchase agreement for contractors found capable of meeting the Government's requirements for environmental services, including but not limited to operation and management of environmental sampling and laboratory analytical services; development of environmental cleanup/emergency response plans; underground storage tank removal; aircraft accident cleanup operations; and removal, transport, and disposal of contaminated soil and investigation-derived waste. Capability packages are due by 10:00 AM ET on July 9, 2015.
https://www.fbo.gov/spg/USAF/ACC/347CONS/FA4830-15-Q-0070/listing.html

SMALL BUSINESS EVENT, ENVIRONMENTAL EPA

U.S. Environmental Protection Agency, Office of Small Business Programs
Federal Business Opportunities, FBO-4940, Environmental_Outreach_2015

U.S. EPA's Office of Small Business Programs has scheduled another vendor outreach session for small environmental businesses to encourage small business networking and convey information about potential procurements. The event will be held the morning of July 16, 2015, from 10:00 to 12:00 in Room 1153 at EPA WJC East, 1201 Constitution Ave. NW, Washington, DC 20460. Register to attend at the Survey Monkey website:
https://www.surveymonkey.com/r/?sm=%2bmuO9lCRXwWZo31Ydvbqk24pjHiWqLqgWyq64ACrnLw%3d Space is limited; only one representative per firm may attend.
https://www.fbo.gov/notices/f599a9dfda4dc59c88b7d73c24f14a7f

ENVIRONMENTAL MULTIPLE AWARD CONTRACT (EMAC) FOR ENVIRONMENTAL SERVICES AND IMPLEMENTATION OF REMEDIAL ACTIONS

Naval Facilities Engineering Command, NAVFAC Mid-Atlantic, Norfolk, VA.
Federal Business Opportunities, FBO-4941, Solicitation N4008515R0309, 2015

The intent of this presolicitation synopsis is to notify potential offerors of a proposed performance-based IDIQ contract for environmental remedial services in support of various NAVFAC Mid-Atlantic areas of responsibility, primarily the Hampton Roads, North Carolina, South Carolina, and Georgia. The proposed contract is 100% set aside for small business firms (NAICS code 562910, size standard of 500 employees) for a base period of up to 12 months plus four one-year option periods. When it becomes available on or about June 22, 2015, offerors can view or download the solicitation and any attachments at the Navy Electronic Commerce Online (NECO) website -- https://www.neco.navy.mil -- or at FedBizOpps. Proposals likely will be due one month later. There is no current contract providing the required services.
https://www.fbo.gov/spg/DON/NAVFAC/N62470HR/N4008515R0309/listing.html

EMAC FOR REMEDIATION OF VARIOUS RADIOLOGICAL CONTAMINANTS (RADMAC II) AT VARIOUS NAVY AND MARINE CORP INSTALLATIONS IN THE NAVFAC SW AND ATLANTIC AREAS OF RESPONSIBILITY

Naval Facilities Engineering Command, NAVFAC Southwest, San Diego, CA.
Federal Business Opportunities, FBO-4946, Solicitation N6247315R0811, 2015

NAVFAC Southwest, San Diego, is preparing to release an RFP for Environmental Remediation Services of Radiological Contaminants at various locations in the NAVFAC SW and Atlantic areas of responsibility. Resulting contracts will be fixed-price, IDIQ, environment multiple-award contracts (EMAC) for a base period of one year with four one-year options, aggregate value not to exceed $240 million. This procurement is unrestricted for competition amongst all interested firms. The Government intends to award a minimum of three and a maximum of five contracts under NAICS code 562910, with one award reserved for small business. The Government will be seeking firms with experience in performing environmental remediation services of various radiological contaminants. In addition to the radiological contamination, hazardous contamination may be present, which may trigger appropriate mixed-waste handling procedures. The solicitation will be available only via download from https://neco.navy.mil or https://www.fbo.gov on or about June 23, 2015.
https://www.fbo.gov/spg/DON/NAVFAC/N68711A6A/N6247315R0811/listing.html

A-E MULTI-MEDIA ENVIRONMENTAL COMPLIANCE ENGINEERING SERVICES AT VARIOUS NAVY AND MARINE CORPS INSTALLATIONS PRIMARILY IN CA, AZ, CO, NM, NV, AND UT

Naval Facilities Engineering Command, NAVFAC Southwest, San Diego, CA.
Federal Business Opportunities, FBO-4939, Solicitation N6247315R0810, 2015

Professional Architect-Engineering (A-E) technical services are required on a firm-fixed-price IDIQ contract for multimedia environmental compliance, with a $95M maximum contract value. The contract term is for a one-year base period with four one-year options for an estimated contract start date in March 2016. This requirement is a small business set-aside, NAICS code 541330, with an annual small business size standard of $15M. The work will be performed primarily in California, and to a lesser extent in Arizona, Colorado, New Mexico, Nevada, Utah, and other DoD or federal sites. A-E technical services are required to assist Navy and Marine Corps installations with meeting their statutory compliance requirements for all applicable environmental laws and regulations under Environmental Restoration (Navy); Munitions Response; Base Realignment and Closure; installation facilities projects; and incidental technical assistance to other NAVFAC or DoD programs. This is not a request for proposal. SF330s will be evaluated to determine the most highly qualified firms. SF330s are due by 2:00 PM PT, July 2, 2015.
https://www.fbo.gov/spg/DON/NAVFAC/N68711A6A/N6247315R0810/listing.html

DOUGLAS HARBOR MAINTENANCE DREDGING, DOUGLAS, ALASKA

U.S. Army Corps of Engineers, USACE District Alaska.
Federal Business Opportunities, FBO-4942, Solicitation W911KB-15-R-0025, 2015

This presolicitation has been issued to give notice of a potential small business competitive procurement for services in surveying, dredging, disposal, and capping of ~27,100 cubic yards of mercury-contaminated silts, sands, and gravels, some of which have not been dredged before, from the harbor basin at Douglas, Alaska. Dredging is restricted to mechanical methods and must be accomplished in a manner that keeps the harbor accessible for traffic. The estimated magnitude of construction is between $5M and $10M, and the project is contingent on availability of funds. The NAICS code is 237990, with a size standard of $27.5M. Any resulting contract will be firm fixed price. The solicitation likely will be available for download on or about June 18, 2015.
https://www.fbo.gov/spg/USA/COE/DACA85/W911KB-15-R-0025/listing.html

Cleanup News

CASE STUDY: 19 YEARS OF ARD MITIGATION AFTER A BACTERICIDE APPLICATION

Gusek, J. and V. Plocus. SME Annual Conference & Expo -- CMA 117th National Western Mining Conference, 15-18 February 2015, Denver, Colorado. Abstracts, p 36, 2015

At the Fisher site, a backfilled and reclaimed (in 1984) surface coal mine in western Pennsylvania, a post-closure toe seep at the site discharged acid rock drainage into a passive treatment system (PTS). In 1995, sodium hydroxide solutions were injected through cased boreholes into the pyritic zones, followed by injections of bactericide solutions. Post-injection, the toe seepage exhibited net-alkaline chemistry. Although the effects of the injection event were expected to be temporary, the beneficial effects of the two-step injection event persist almost two decades later, and bond release for the site is pending. Over 25 years of seep chemistry monitoring data suggest that the steady-state condition of net alkalinity in the seep water entering the PTS may be permanent. The current theory is that the initial suppression of *Acidithiobacillus ferrooxidans* bacterial community with the injected reagents has been maintained by the seasonal infusion of bactericidal organic acids derived from the robust vegetative cover. The situation appears to be self-sustaining.*Additional information*:
http://www.asmr.us/Meetings/2014/2014%20Monday%20S-1/RM17_400_MON_GUSEK.pdf *and*
http://www.infomine.com/library/publications/docs/Gusek2014.pdf.

SUSTAINABLE PHYTOREMEDIATION TO REMOVE LEACHATE

Halderman, H. SME Annual Conference & Expo -- CMA 117th National Western Mining Conference, 15-18 February 2015, Denver, Colorado. Abstracts, p 90, 2015

A landfill located in Baton Rouge, Louisiana, contained spent slurried red mud residues from a facility that used bauxite reacted under pressure with hot caustics to produce alumina. Leachate (with high aluminum, arsenic, barium, and vanadium concentrations) was found to be seeping from impoundment sidewalls and potentially flowing to adjacent water bodies. When the State of Louisiana ordered installation of a collection system to prevent further seepage, a patented phytoremediation technology, TreeWell®, was designed and installed as a sustainable solution for leachate removal to depths >15 ft bgs. The TreeWell® System utilizes the landfill leachate as a water source, eliminating off-site migration*Additional information*:
http://www.trcsolutions.com/Lists/Projects/ViewProject.aspx?ID=214

Demonstrations / Feasibility Studies

THE LANDUSKY MINE BIOTREATMENT SYSTEM: COMPARISON OF CONVENTIONAL BIOREACTOR PERFORMANCE WITH A NEW ELECTRO-BIOCHEMICAL REACTOR (EBR) TECHNOLOGY

Opara, A., M.J. Peoples, D.J. Adams, and W.C. Maehl.
2014 SME Annual Meeting and Exhibit, 23-26 February, Salt Lake City, UT. Society for Mining, Metallurgy, and Exploration, Transactions Volume 336, 6 pp, 2014

Conventional bioreactor systems, such as the one installed at the Landusky Mine (a former gold mine in north-central Montana), use nutrients and chemicals to provide electrons for reduction-oxidation reactions of contaminants. The innovative electro-biochemical reactor (EBR) system provides a controllable, consistent supply of useable electrons directly to the microbes at low voltage potential (1-3 V). EBR technology overcomes shortcomings found in the conventional system by reducing the volume of nutrients required and providing a controllable, efficient, economical, and robust biotreatment. Because the EBR process produces no excess solids or biomass, it requires no solids management post-treatment systems. This paper presents an overview of system renovation and compares results obtained from the pilot EBR and the original Landusky biotreatment system. The EBR system removed all nitrates and achieved 95% Se removal efficiency using a 26-hr shorter retention time than the existing full-scale conventional bioplant, which had achieved only about 51% removal.
http://www.inotec.us/uploads/5/1/2/8/5128573/13.10_sme_landusky_f.pdf

A SUSTAINABLE REMEDIATION APPROACH FOR COMPLETE DESTRUCTION OF CHLOROETHANES IN GROUNDWATER

Cheatham, Michael, Master's thesis, Louisiana State University, 81 pp, 2014

A pilot study for site optimization utilizing activated carbon and anaerobic bioreactors (ABR) was initiated at the RE-SOLVE Inc. Superfund site in 2001. The ABR systems—composed of a sand/peat mixture meant to host bacterial colonies that are known to actively degrade chlorinated compounds—were installed within the ground on site. The genera present in the beds included *Dehalococcoides* and *Dehalobacter* (known to degrade chlorinated ethenes and chlorinated ethanes, respectively). At the completion of an extensive testing program, full-scale operation of the pilot ABR system began in July 2012. Two ABR beds, capable of operating in series or in parallel were installed to treat the primary CVOCs (cDCE and VC ~1 mg/L; 1,1,1-TCA and 1,1-DCA ~0.2 mg/L) in groundwater, plus small quantities of BTEX compounds. Installation of a photovoltaic solar system now allows the site to operate independently of the Massachusetts energy grid. ABR system operation encompasses treatment processes for all contaminants at the site, including chloroethane, 1,1-DCA, VC, cis-1,2-DCE, 1,1,1-TCA, and PCBs, which are treated with activated carbon before entering the bed. http://etd.lsu.edu/docs/available/etd-11132014-235426/

REVISED GROUNDWATER PILOT TEST WORK PLAN, QUAIL CROSSING NEIGHBORHOOD, ANDOVER, KANSAS

Kansas Department of Health and Environment (KDHE), 41 pp, 2015

Following baseline sampling, ORC Advanced® will be injected to address gasoline constituents at specific locations using direct injection techniques. The compound will be mixed with water to form an injectable slurry (~1.5 gal water per 10 lb ORC) which then is pressure-injected (using an aboveground pump) into the saturated zone. Injection of the slurry will occur within 30 minutes after its on-site preparation. For the typical injection point, ~142 gal slurry will be injected from 10 ft above to 10 ft below the approximate groundwater elevation. This vertical profile is anticipated to accommodate seasonal groundwater fluctuations at the site, and the volume is expected initially to affect an aquifer area of roughly 63 ft^2 surrounding each injection point. Assuming a porosity of 0.3, which is common for shale, this volume equates to a radius of ~1.0 ft surrounding the injection location. The total slurry volume injected will be about 1,280 gal. Once in the aquifer, ORC Advanced will produce a controlled release of oxygen that is expected to affect a significantly larger area and to enhance aerobic biodegradation of the gasoline constituents for ~9 months.
http://www.kdheks.gov/remedial/site_restoration/download/Nustar_GWPilotTestWP.pdf

PILOT TESTING OF AN ELECTROKINETIC BARRIER: DISSOLVED CHLORIDE AT THE FORMER CN IRMA LANDFILL

Burghardt, J. and S. Hains.
RemTech 2014: Remediation Technologies Symposium 2014, 30 slides, 2014

Between 1978 and 1994, 26 cells at the CN Irma Industrial Landfill were constructed, filled, and reclaimed. Three cells filled with potash have contributed to elevated concentrations of dissolved chloride in the groundwater. An electrokinetics (EK) pilot test was implemented downgradient of one of the potash-containing cells, where dissolved chloride concentrations above 20,000 mg/L have been measured. The pilot EK barrier—a row of three anodes located upgradient of a row of two cathodes—was oriented perpendicular to the direction of groundwater flow and plume migration axis. Three anode wells, two cathode wells, four monitoring wells, and eight monitoring points were constructed in the pilot test zone. The EK pilot test operated for six weeks in 2013. Migration of chloride species toward the anode was in the opposite direction of regional groundwater flow, which confirmed the efficiency of the barrier. Positively charged ions migrated toward the cathodes and negatively charged ions migrated toward the anodes. No accumulation of Cl^- was identified near the anodes due to transformation of Cl^- to chlorine and hydrochloric acid. Further testing of chlorine gas emissions and optimization of the process will be completed prior to full-scale implementation.
Slides: http://www.esaa-events.com/proceedings/remtech/2014/pdf/14-Burghardt.pdf
Longer abstract: http://www.esaa-events.com/remtech2014/2014abstracts/Abstract%2053.pdf

Research

ONE ALTERNATE EXPOSURE PATHWAY OF VOC VAPORS FROM CONTAMINATED SUBSURFACE ENVIRONMENTS INTO INDOOR AIR: LEGACY SEWER-PLUMBING SYSTEMS

Jacobs, J.A., O.P. Jacobs, and K.G. Pennell.
Hydrovisions, Vol 24 No 1, 20-24, 2015

Sewer-plumbing systems, land drains, and subsurface utility conduits, lines, and trenches are alternate exposure pathways in the shallow subsurface that allow VOCs to migrate into indoor air. Sewers that are well past their design life (i.e., legacy sewers) allow for leakage into and out of the pipes. This article highlights the often overlooked implication of legacy sewers and their interception of VOC plumes with the potential for VOC-impacted sewer air to enter indoor air spaces. http://grac.org/hv/spring2015.pdf

IN SITU AND EX SITU BIOREMEDIATION OF RADIONUCLIDES CONTAMINATED SOILS AT NUCLEAR AND NORM SITES

Francis, A.J. and Y.V. Nancharaiah.
BNL-107326-2015-BC, 93 pp, 2014 [Accepted for publication in *Environmental Remediation and Restoration of Contaminated Nuclear and NORM Sites*, L. Van Velzen (ed.), Elsevier Ltd., 2015.]

Microorganisms potentially can solubilize and immobilize a wide range of naturally occurring radionuclides, actinides, and fission products. Their ability to do so encompasses mechanisms such as oxidation-reduction reactions, production of sequestering agents, bioaccumulation, and biocrystallization, and these mechanisms can be exploited to remediate radionuclide-contaminated environments. This chapter contains a brief review of the key microbial processes underlying the biotransformation of radionuclides of concern and discusses their potential application for in situ or ex situ bioremediation of radionuclide-contaminated soil, sediment, and waste.
http://www.bnl.gov/envsci/pubs/pdf/2015/BNL-107326-2015-BC.pdf

SPATIOTEMPORAL CHANGES OF CVOC CONCENTRATIONS IN KARST AQUIFERS: ANALYSIS OF THREE DECADES OF DATA FROM PUERTO RICO

Yu, X., R. Ghasemizadeh, I. Padilla, C. Irizarry, D. Kaeli, and A. Alshawabkeh.
Science of the Total Environment, Vol 511, 1-10, 2015

This study explored the spatial and temporal distribution patterns of chlorinated VOCs (CVOCs) within the northern karst aquifers of Puerto Rico between 1982 and 2013. Historically, 76% and 52% of the 615 sampling sites exhibited CVOC concentrations above the detection limit and maximum contamination level, respectively. Despite a decreasing trend in concentrations, there is a general northward movement and spreading of contaminants even beyond the extent of known sources of the Superfund and landfill sites. The analyses show that spatial distributions of CVOCs depend on source origin and karst characteristics, thus indicating that monitoring of the CVOC concentrations should be continuous and more ubiquitous, and that their impacts on the sustainability of water resources merits further evaluation. **Poster presentation:**
http://www.northeastern.edu/alshawabkeh/wp-content/uploads/2014/10/Xue-Yu.pdf

MONITORING THE INJECTION OF MICROSCALE ZEROVALENT IRON PARTICLES FOR GROUNDWATER REMEDIATION BY MEANS OF COMPLEX ELECTRICAL CONDUCTIVITY IMAGING

Flores Orozco, A., M. Velimirovic, T. Tosco, A. Kemna , H. Sapion, N. Klaas, R. Sethi, L. Bastiaens.
Environmental Science & Technology, Vol 49 No 9, 5593-5600, 2015

Researchers investigated the application of complex electrical conductivity imaging, a geophysical method, to monitor the high-pressure injection of microscale zero-valent iron (mZVI) particles in a field-scale application. The images revealed an increase in the induced electrical polarization (~20%) upon delivery of ZVI into the targeted area owing to the accumulation of metallic surfaces at which the polarization takes place. Larger changes (>50%) occurred in shallow sediments a few meters away from the injection, suggesting the migration of particles through preferential flowpaths. Correlation of the electrical response and geochemical data (e.g., analysis of recovered cores from drilling after the injection) confirmed the migration of particles (and stabilizing solution) to shallow areas through fractures formed during the injection. Results demonstrate the suitability of the complex conductivity imaging method to monitor mZVI transport during subsurface amendment in quasi real time.

CONSTRUCTION CONSIDERATIONS FOR ISS BENCH-SCALE STUDIES AND FIELD-SCALE MONITORING PROGRAMS

Andromalos, K., D. Ruffing, and V. Spillane.
Journal of Hazardous, Toxic, and Radioactive Waste, Vol 19 No 1, Paper C4014001, 2015

In situ solidification/stabilization (ISS) projects require a significant amount of characterization, sampling, and bench-scale testing in the design or feasibility phase to ensure a successful project. During this phase the proposed construction methods need to be considered, taking into account slurry proportions, untreated soil type/density, treated soil consistency, and soil/contaminant variability. Many of the available in situ testing methods were not developed for ISS mixtures and are limited for use in this application. Additionally, many of the lab tests conducted on field-collected grab samples, specifically leachability tests, require long lead times and provide only limited real-time feedback. The authors recommend that the QA/QC monitoring program should include a combination of short and long turnaround testing to be used collectively to predict the long-term performance of the improved material. This strategy can account for the advantages and disadvantages of each monitoring method.

ASSESSMENT OF THE USE OF SORBENT AMENDMENTS FOR REDUCTION OF MERCURY METHYLATION IN WETLAND SEDIMENTS AT ACADIA NATIONAL PARK, MAINE

Huntington, T.G., A. Lewis, A. Amirbahman, M.C. Marvin-DiPasquale, and C.W. Culbertson .
U.S. Geological Survey Scientific Investigations Report 2014-5234, 44 pp, 2015

The U.S. Geological Survey in cooperation with the National Park Service carried out a series of lab and field experiments to evaluate the potential of zero-valent iron (ZVI) and granular activated carbon (GAC) to reduce the rate of the bacterially mediated process of mercury methylation and subsequent biological uptake by the great pond snail *Lymnaea stagnalis*. The experimental results were inconsistent: ZVI had no effect on uptake in one experiment but resulted in a significant decrease in uptake in a second experiment, while GAC did not affect bio-uptake in either experiment. http://pubs.er.usgs.gov/publication/sir20145234

BIBLIOGRAPHY FOR ACID-ROCK DRAINAGE AND SELECTED ACID-MINE DRAINAGE ISSUES RELATED TO ACID-ROCK DRAINAGE FROM TRANSPORTATION ACTIVITIES

Bradley, M.W. and S.C. Worland.
U.S. Geological Survey Open-File Report 2015-1016, 24 pp, 2015

Acid-rock drainage (ARD) occurs through the interaction of rainfall on pyrite-bearing formations. When pyrite is exposed to oxygen and water in mine workings or roadcuts, the mineral decomposes, and sulfur can react to form sulfuric acid, which often results in environmental problems and potential damage to the transportation infrastructure. The accelerated oxidation of pyrite and other sulfidic minerals generates low pH water with potentially high concentrations of trace metals. Much attention has been given to contamination arising from acid mine drainage, but studies related to ARD from road construction are relatively limited. The U.S. Geological Survey, in cooperation with the Tennessee Department of Transportation, is conducting an investigation to evaluate the occurrence and processes controlling ARD and contaminant transport from roadcuts in Tennessee. This report describes the basic components of ARD resulting from transportation activities and presents a bibliography organized by categories of remediation, geochemical, microbial, biological impact, and secondary mineralization.
http://pubs.er.usgs.gov/publication/ofr20151016

MODELING LONG-TERM TRENDS OF CHLORINATED ETHENE CONTAMINATION AT A PUBLIC SUPPLY WELL

Chapelle, F.H., L.J. Kauffman, and M.A. Widdowson.
Journal of the American Water Resources Association, Vol 51 No 1, 1-13, 2015

A mass-balance solute-transport modeling approach was used to investigate the effects of DNAPL volume, composition, and generation of daughter products on simulated and measured long-term trends of chlorinated ethene (CE) concentrations at a public supply well. The model was built by telescoping a calibrated regional 3D MODFLOW model to the capture zone of a public supply well that has a history of CE contamination. The SEAM3D code then was used with the local model to simulate the interactions between naturally occurring organic carbon that acts as an electron donor, and dissolved oxygen, CEs, ferric iron, and sulfate that act as electron acceptors. Modeling results indicate that asymmetry between rapidly rising and more gradually falling concentration trends over time suggests a DNAPL rather than a dissolved source of CEs. Peak concentrations of CEs are proportional to the volume and composition of the DNAPL source. The persistence of contamination, which can vary from a few years to centuries, is proportional to DNAPL volume, but is unaffected by DNAPL composition. These results show that monitoring CE concentrations in raw water produced by impacted public supply wells over time can provide useful information concerning the nature of contaminant sources and the likely future persistence of contamination.

SEQUENTIAL SOIL FLUSHING FOR REMEDIATION OF COMPLEX CONTAMINATED SOILS: A PILOT-SCALE TEST

Gillan, K., S.M. Yun, and H.S. Kim.
Advanced Materials Research, Vols 1073-1076, 704-707, 2014

To develop an in situ soil flushing method using horizontal injection/suction channels, a pilot-scale box reactor (1 m x 0.6 m x 0.7 m) was employed to evaluate desorption of complex contaminants from contaminated soils by flushing agents. Heavy petroleum oils (HPOs) and heavy metals can be removed by different mechanisms, which require different types of flushing agents. Hydrogen peroxide and citric acid were selected and injected sequentially as flushing agents for HPOs and heavy metals, respectively. Soils contaminated with HPOs, Zn, and Pb were collected from a railroad site and packed into the pilot reactor. Two horizontal channels were installed: the injection channel was placed 10 cm below the top of soil surface and the suction channel was placed 10 cm above the bottom of the reactor. Flushing agents were injected at a flow rate of 3.86 mL/min for 1 month. The initial concentrations of HPOs (4685.5±374.4 mg/kg), Zn (204.9±60 mg/kg), and Pb (139.8 mg/kg) (n = 3) declined after soil flushing to 1448.4±166.7 mg/kg (HPOs), 143.4 mg/kg (Zn), and 99.5 mg/kg (Pb), for total removal rates of 69%, 30% and 28.9%, respectively.

General News

LESSONS LEARNED FROM ENVIRONMENTAL REMEDIATION PROGRAMMES

International Atomic Energy Agency, Vienna. IAEA Nuclear Energy Series No. NW-T-3.6, STI/PUB/1630, ISBN: 978-92-0-145310-5, 67 pp, 2014

This report reviews accumulated experience from hundreds of cleanup projects (sites not necessarily contaminated by radioactive materials) and relates it to the principal engineering designs and strategies employed, including the funding of remediation projects, planning, contracting, cost estimates and procurement, and issues related to long-term stewardship. The lessons learned are collected here to guide decision-makers on how best to apply this information to future projects. Chapter 4 focuses specifically on remediation of uranium mining and milling sites.
http://www-pub.iaea.org/MTCD/Publications/PDF/Pub1630_web.pdf

LEGISLATION, TECHNOLOGY AND PRACTICE OF MINE LAND RECLAMATION

Hu, Z. (ed).
CRC Press, Boca Raton, FL. ISBN 9781138027244, 684 pp, 2014

This book contains 96 papers from the proceedings of the Beijing International Symposium on Land Reclamation and Ecological Restoration (LRER 2014, Beijing, China, 16-19 October 2014). The contributions cover a wide range of topics: monitoring, prediction, and assessment of environmental damage in mining areas; subsidence land reclamation and ecological restoration; mining methods and measures for minimization of land and environmental damage; solid wastes and acid mine drainage treatment; contaminated land remediation; reclamation and ecological restoration of surface mined land; and eight case studies on mine site reclamation and ecological restoration. *View the table of contents and abstracts at* http://www.crcnetbase.com/isbn/9781315732138.

IN-SITU REMEDIATION OF ARSENIC-CONTAMINATED SITES

Bundschuh, J., H.M. Hollaender, and L.Q. Ma (eds).
CRC Press, Boca Raton, FL. ISBN: 9780415620857, 208 pp, 2014

In seven chapters, this text provides an introduction, scientific background, case studies, and future perspectives of in situ arsenic remediation technologies for soil, sediment, and groundwater at geogenic and anthropogenic contaminated sites. Discussions include natural arsenic, specifically arsenate and arsenite, as well as organic arsenic compounds. The case studies present the use of in situ technologies, covering geochemical, microbiological, and plant-based ecological solutions for arsenic remediation. *See the table of contents and chapter abstracts at* http://www.crcnetbase.com/isbn/9780203120170.

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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