Technology Innovation News Survey

Entries for September 1-15, 2014

Market/Commercialization Information

SMALL BUSINESS EVENT: REGION 5 SMALL BUSINESS CONFERENCE
U.S. Environmental Protection Agency, Office of Small Business Programs.
Federal Business Opportunities, FBO-4696, EPA_Region5_Chicago_2014

EPA Region 5, in partnership with the Young Entrepreneurs of the Universe, will hold its annual small business conference on Wednesday, November 5, 2014, from 8:30 AM - 3:00 PM on the 12th floor, Metcalfe Federal Building, 77 W. Jackson Blvd., Chicago, Illinois. The one-day conference brings together EPA program officials, acquisition personnel, other federal agency procurement officials, and prime contractors in an effort to inform and educate small businesses about the various opportunities to do business with EPA and other federal, state, and local government agencies. Register for the Region 5 small business conference at http://www2.epa.gov/aboutepa/forms/register-region-5-small-business-conference. The draft meeting agenda is posted with the notice at FBO.gov. https://www.fbo.gov/notices/6d668ac829bab5778be025dd331a1207.

SMALL BUSINESS EVENT: ENVIRONMENTAL PROTECTION AGENCY'S SERVICE-DISABLED VETERAN-OWNED SMALL BUSINESS (SDVOSB) OUTREACH
U.S. Environmental Protection Agency, Office of Small Business Programs, Washington, DC.
Federal Business Opportunities, FBO-4704, Solicitation SDVOSB_OUTREACH_2014

EPA's Office of Small Business Programs will host a Vendor Day on Tuesday, November 4, 2014, to provide current and prospective SDVOSB vendors with the opportunity to interact with OSWER Program Managers, EPA Contract Officers, and current EPA contractors. All attendees must register at https://www.surveymonkey.com/s/SDVOSB110414 by Friday, October 29, 2014. Due to space limitations, registration will be limited to the first 130 registrants. https://www.fbo.gov/notices/dc67d7271375d2dc8f5672cae989d7e1.

EPA REGION 9, WATER DIVISION CONSULTANT SERVICES CONTRACT, SOURCES SOUGHT
U.S. Environmental Protection Agency, Region IX, San Francisco, CA.
Federal Business Opportunities, FBO-4688, Solicitation SOL-R9-14-00003, 2014

U.S. EPA is conducting market research in preparation for a future procurement for EPA's Pacific Southwest Water Division (Region 9), which has the responsibility of implementing the Clean Water Act, Safe Drinking Water Act, and the Marine Research Sanctuary Act in Arizona, California, Hawaii, Nevada, Pacific Islands, and 148 tribal nations. Contractors submitting capability statements should expect that they would be required to provide all necessary labor, materials, and services in support of the draft performance work statement (PWS), which has been posted on FedConnect. EPA anticipates a multiple-award IDIQ contract with primarily firm-fixed-price task orders for a base period of 12 months and four 12-month option periods, NAICS code 541620, size standard of $15M. The draft PWS is broken into three separate modules: Safe Drinking Water Act, Clean Water Act, and Infrastructure. Any interested firm can submit a maximum of five pages to indicate the specific module(s) of interest and the firm's ability to perform the key requirements described in the draft PWS. Responses to this sources sought are due by 6:00 PM PT, October 23, 2014, and must be submitted through https://www.fedconnect.net/. https://www.fbo.gov/spg/EPA/OAM/RegIX/SOL-R9-14-00003/listing.html

SPECTRAL COMBS FROM UV TO THZ (SCOUT)
Defense Advanced Research Projects Agency (DARPA), Arlington, VA.
Federal Business Opportunities, FBO-4702, Solicitation DARPA-BAA-15-01, 2014

DARPA's SCOUT program seeks new capabilities for highly sensitive remote detection of multiple biological or chemical agents in liquid or gaseous form. The SCOUT program aims to harness optical frequency comb (OFC) technology, which is akin to using thousands of lasers simultaneously (like extremely fine teeth on a hair comb) to enable both high sensitivity and wide spectral coverage for detecting multiple types of substances at extended distances. The program has identified four spectral regions for technical development of chip-scale OFCs and potential uses: Ultraviolet to visible (useful for biological threat detection and real-time monitoring of chemical reactions); mid-wave infrared (useful for breath analysis applications); long-wave infrared (useful for detection of explosives); and submillimeter/terahertz (useful for detection of complex molecules). Via this Broad Agency Announcement, the SCOUT program seeks expertise in optical materials processing and device fabrication, chip-based OFC generation, high-resolution metrology and molecular spectroscopy, and algorithm development and data processing as well as domain expertise in trace level chemical and biological threat detection. Firms are encouraged to submit an abstract in advance of a full proposal to minimize effort and reduce the potential expense of preparing an out-of-scope proposal. Abstracts are due by 4:00 pm ET, October 23, 2014, and full proposals are due by 4:00 pm ET, November 25, 2014. https://www.fbo.gov/spg/ODA/DARPA/CMO/DARPA-BAA-15-01/listing.html

ENVIRONMENTAL ENGINEERING
National Science Foundation (NSF), Funding Opportunity PD-14-1440, 2014

NSF is soliciting proposals for research projects relevant to its Environmental Engineering program. Major areas of interest are as follows:

- Convert wastes into value-added materials and energy, reduce energy/water demand for environmental technologies, and determine the impact of energy and transportation processes on the environment.
- Develop innovative biological, chemical, and physical treatment processes to meet the growing demand for water.
- Investigate the fate, transport, and remediation of potentially harmful contaminants and their degradation products.

The average annual award size for the program is $110,000. The window of opportunity for submitting proposals is October 1 - November 5, 2014. Details at http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=501029.

Cleanup News

CHALLENGES RELATED TO 1,4-DIOXANE CHARACTERIZATION, EVALUATION AND TREATMENT: THREE CASE EXAMPLES
Teaf, C.M. and M.M. Garber.
Selected Manuscripts from the 29th Annual International Conference on Soils, Sediments, Water and Energy, University of Massachusetts Amherst, 21-24 October 2013, 39-56, 2014

Case studies from Colorado, Arizona, and South Carolina are provided as examples of how the identification of 1,4-dioxane in groundwater samples resulted in changes to remediation plans and/or monitoring of the sites and surrounding off-site properties. The case studies include background information on the site, quantities of 1,4-dioxane detected, treatment technologies deployed, and current site status.*See* ***PDF pages 51-68*** *in the file at* http://www.aehsfoundation.org/Member/AEHSFoundation/Images/ImageGallery/Reduced-%20Contaminated%20Soils,%20Sediments,%20Water,%20&%20Energy%20Volume%2019%20Proceedings(1).pdf.

ANAEROBIC BIOSTIMULATION AS A SECONDARY TREATMENT OPTION FOR THE REMEDIATION OF PETROLEUM HYDROCARBON IMPACTS AT TWO GASOLINE SERVICE STATIONS ON LONG ISLAND, NY
Hinshalwood, G., J. Curran, and C. Meyer.
Selected Manuscripts from the 29th Annual International Conference on Soils, Sediments, Water and Energy, University of Massachusetts Amherst, 21-24 October 2013, 57-72, 2014

Two gasoline service stations on Long Island, New York, initially were treated using air sparging/soil vapor extraction (Site 1) and ground water pump and treat (Site 2) to address the source materials, but acceptable endpoint concentrations with respect to groundwater quality were not met in either case. This paper describes the results of secondary treatment through the injection of alternative electron acceptors (sulfate and a sulfate/nitrate mix, respectively) to stimulate indigenous anaerobic microbiological activity in groundwater at the two sites. Anaerobic biostimulation through the addition of sulfate as a terminal electron acceptor under sulfate-reducing conditions can be an effective method of reducing dissolved-phase petroleum hydrocarbon contaminant mass, provided a critical sulfate mass flux is sustained in the treatment zone*See* ***PDF pages 69-84*** *at* http://www.aehsfoundation.org/Member/AEHSFoundation/Images/ImageGallery/Reduced-%20Contaminated%20Soils,%20Sediments,%20Water,%20&%20Energy%20Volume%2019%20Proceedings(1).pdf.

REMEDIAL DESIGN-STAGE OPTIMIZATION REVIEW REPORT: SANDY BEACH GROUND WATER PLUME SUPERFUND SITE, TARRANT COUNTY, TEXAS, EPA REGION 6
U.S. EPA, Office of Superfund Remediation and Technology Innovation.
EPA 542-R-14-003, 49 pp, 2014

The optimization review team recommended prioritizing installation of the soil vapor extraction (SVE) system in the source area both as a means of direct source control and treatment and to address data gaps. Installation of the SVE system will enable evaluation of the potential for additional sources of TCE (such as buried drums) to be excavated and identify areas of contamination that might provide long-term sources of contaminants to groundwater. An additional in situ bioremediation (ISB) pilot test was suggested to optimize the efficacy of ISB treatment and identify potential water quality impacts. The team also recommended appropriate scaling of the groundwater pump-and-treat system by reducing the initial number of extraction wells while increasing the capacity of the groundwater treatment plant up to 150 gpm as a contingency in case expansion of the extraction system is needed. http://www.clu-in.org/download/remed/bvopt/application/rses/superfund_rses/SandyBeachRoad_OptimizationReport_April2014.pdf.

OPTIMIZATION REVIEW: LOCKWOOD OPERABLE UNIT 2 — SOCO/BRENNTAG SOURCE AREA BILLINGS, MONTANA
U.S. EPA, Office of Superfund Remediation and Technology Innovation.
EPA 542-R-14-010, 103 pp, 2014

The Lockwood Solvent Groundwater Plume Site is managed as two operable units (OUs), and OU2 consists of affected media associated with the Brenntag (Soco; Area A) source area. This optimization review addressed remedial components planned for soil and groundwater in OU2 that are affected by chlorinated VOCs, primarily PCE and daughter products. Recommendations to improve remedy effectiveness include addressing data gaps through additional site characterization, which can be used to scale and position remedial components for maximum efficacy. The optimization review team recommends a combination of expanded soil vapor extraction/ozone sparging, excavation, and ex situ soil treatment with ex situ SVE/ozone sparging, followed by in situ bioremediation (ISB) of source area contamination. Targeted excavation of highly contaminated, low-permeability soils followed by ex situ SVE/ozone sparge treatment on site should reduce the potential for long-term back diffusion. ISB treatment at the base of the excavations will stimulate anaerobic degradation of the residual CVOCs. High CVOC concentrations in site soil suggest the presence of NAPL. http://www.clu-in.org/download/remed/bvopt/application/rses/superfund_rses/Final_Lockwood_OU2_Opt_Review_Report.pdf.

GROUNDWATER SOLVENT CLEANUP WILL USE CHEESE WHEY AND VEGGIE OIL TO FEED NATURAL BACTERIA
Alameda Point Environmental Report, 9 May 2014

A Navy contractor will be cleaning up dissolved-phase TCE in groundwater in part of the Alameda Point Town Center area by injecting a solution of cheese whey, emulsified vegetable oil, and water into nearly 200 wells that go down between 30 and 40 ft. A leak from a rail car is believed to be a major source of the plume. The cheese whey will be delivered to the site already diluted in water. A hose will be connected to a fire hydrant and hooked to a metering device to mix the whey and oil solution with municipal water as it is pumped into the wellheads. The work is expected to begin in 2015, with periodic visits and testing until 2020. During the first year of operation, the contractor will make two visits of 35 days each to inject 246,000 gallons of whey, oil, and water solution (per visit) into the ground, allowing gravity to disperse the liquid.
http://alamedapointenvironmentalreport.wordpress.com/2014/05/09/groundwater-solvent-cleanup-will-use-cheese-whey-and-veggie-oil-to-feed-natural-bacteria/.

Demonstrations / Feasibility Studies

REMEDIATION OF CONTAMINATED GROUNDWATER USING PERMEABLE REACTIVE BARRIERS (RESET)
Tuominen, S., T. Nysten, and J. Reinikainen. Finnish Environment Institute website, 2014

The long-term performance of a pilot-scale PRB installed at the Orivesi (Finland) field site has been monitored since summer 2006. The dimensions of the granular iron PRB were designed on the basis of lab experiments to ensure the removal of chlorinated solvents (PCE, TCE, and their degradation products) released to the subsurface by a dry cleaner. The system has a funnel-and-gate configuration with an additional control well. In the Orivesi project, traditional open pit and cleat-supported excavation techniques were essentially the only available earthwork methods for barrier installation. The fracture zones in bedrock were filled with injection material to eliminate contaminated groundwater bypass below the PRB. http://syke.fi/projects/reset.

DEMONSTRATION TESTING OF A THERMAL DESORPTION UNIT TO RECEIVE AND TREAT WASTE WITH UNLIMITED CONCENTRATION OF PCBS
Orton, T.L. and C.R. Palmer. WM2013: Waste Management Conference, 24-28 February 2013, Phoenix, Arizona. Paper 13437, 12 pp, 2013

A high-performance thermal desorption unit (HP-TDU) has successfully processed over 1,850 tons of organically contaminated radioactive mixed waste. The state of Utah, U.S. EPA Region 8, and U.S. EPA headquarters granted permits and approvals that enabled the treatment of several waste categories, including VOCs and SVOCs, combustion-coded compounds, volatile metals, and PCBs. The unit successfully completed demonstration testing for PCB concentrations up to 660,000 ppm, yielding solid processed material http://www.wmsym.org/archives/2013/papers/13437.pdf

REMEDIATION OF METAL-CONTAMINATED SOIL IN POLAR ENVIRONMENTS: PHOSPHATE FIXATION AT CASEY STATION, EAST ANTARCTICA
Hafsteinsdottir, E.G., K.A. Fryirs, S.C. Stark, and D.B. Gore.
Applied Geochemistry, Vol 51, 33-43, 2014

A pilot-scale metal stabilization field study was conducted at Casey Station, East Antarctica, where phosphate (triple superphosphate and phosphate rock) and a buffer, Emag (magnesium carbonate and magnesium oxide), were introduced to contaminated soil from the Thala Valley landfill. The pilot was sampled and monitored from December 2008 to February 2010. Relative to levels in the untreated landfill material, phosphate addition decreased Cd, Cu, Co, Fe, Mn, Pb, and Zn concentrations in leachates (fixation was most effective for Mn and Zn), but increased As, Cr, and Ni concentrations. A 3:2 ratio of triple superphosphate and Emag gave the most successful fixation. Although an undesirable initial flush of metals from the contaminated soil occurred in the 24-48 hours after treatment addition, metal concentrations in leachate declined and stabilized in the second summer. *Additional information*: http://avestia.com/ICEPR2014_Proceedings/papers/14.pdf.

Research

OBSERVED FIELD SCALE FIRST ORDER ATTENUATION RATES OF BTEX
Stevens, N.
Selected Manuscripts from the 29th Annual International Conference on Soils, Sediments, Water and Energy, University of Massachusetts Amherst, 21-24 October 2013, 153-164, 2014

Evaluation of BTEX concentrations and first-order attenuation at 24 petroleum release sites located in the eastern United States was performed to estimate field-scale attenuation rates of benzene, toluene, ethylbenzene, and total xylenes under varying release conditions. The size and geographic spread of the primary dataset makes the findings potentially applicable to a large number of petroleum release sites. *See* ***PDF pages 165-176*** *at* http://www.aehsfoundation.org/Member/AEHSFoundation/Images/ImageGallery/Reduced-%20Contaminated%20Soils,%20Sediments,%20Water,%20&%20Energy%20Volume%2019%20Proceedings(1).pdf.

A METHODOLOGY FOR PRE-EVALUATION OF ECOEFFICIENCY OF ENVIRONMENTAL TECHNOLOGIES FOR SUSTAINABLE REVITALIZATION OF POST-INDUSTRIAL SITES
Sokol, W.A.
Selected Manuscripts from the 29th Annual International Conference on Soils, Sediments, Water and Energy, University of Massachusetts Amherst, 21-24 October 2013, 133-152, 2014

Methods that allow pre-evaluation of responses intended to correct site degradation and maximize the range of possible end uses are valuable tools for sustainable development. This paper presents criteria for pre-evaluation of energy commitment, material requirements, and emissions to soil, water, and air. Example technologies selected from databases of technologies and tools were evaluated in a framework of the international EFFECT project. *See* ***PDF pages 145-164*** *at* http://www.aehsfoundation.org/Member/AEHSFoundation/Images/ImageGallery/Reduced-%20Contaminated%20Soils,%20Sediments,%20Water,%20&%20Energy%20Volume%2019%20Proceedings(1).pdf.

BIOREMEDIATION OF CHLORINATED ETHENES IN FRACTURED BEDROCK AND ASSOCIATED CHANGES IN DECHLORINATING AND NONDECHLORINATING MICROBIAL POPULATIONS

Perez-de-Mora, A., A. Zila, M.L. McMaster, and E.A. Edwards.
Environmental Science & Technology, Vol 48 No 10, 5770-5779, 2014

Enhanced in situ anaerobic bioremediation (EISB) was evaluated for the treatment of TCE-contaminated groundwater in fractured carbonate rock at a site in Southern Ontario, Canada, with cool average groundwater temperature (~13°C). During biostimulation with ethanol, concentrations of TCE daughter products cDCE and VC decreased in association with an enrichment of vcrA (VC reductive dehalogenase)-carrying *Dehalococcoides*, whereas ethene production was only moderate. Following bioaugmentation with the mixed dechlorinating culture KB-1, greater concentrations of chloride (a dechlorination product) was observed in most wells; in addition, ethene production increased significantly in monitoring well locations that had strong hydraulic connectivity to the groundwater recirculation system, while *Dehalococcoides* and vcrA concentrations did not vary appreciably. Increases of 3 to 4 orders of magnitude of an ethanol-fermenting *Bacteroidetes* population also present in KB-1 were correlated to improved conversion to ethene, an observation that suggests a potential causal relationship, such as better syntrophy and/or synergy among bacterial populations. *For additional background on this study, see A. Zila's 2011 Master's thesis at* http://www.beem.utoronto.ca/sites/www.beem.utoronto.ca/files/Zila%202011%20MEng%20thesis.pdf

EFFECT OF OXYGEN CONTENT ON THE THERMAL DESORPTION OF POLYCHLORINATED BIPHENYLS CONTAMINATED SOIL
Liu, J., Z. Zhao, T. Chen, A. Buekens, and J. Yan.
DIOXIN 2014: The 34th International Symposium on Halogenated Persistent Organic Pollutants, 31 August - 5 September, Madrid, Spain. 4 pp, 2014

Under anaerobic conditions, thermal desorption of PCBs is accompanied by dechlorination and decomposition, whereas in the presence of oxygen, PCBs can act as precursors of polychlorinated dibenzofurans (PCDFs). An investigation of thermal desorption of PCB-contaminated soil with several carrier gases with different oxygen content was conducted to study the concentrations of PCBs and PCDD/Fs in evolved gas and soil after treatment. http://mci-group.es/usbdioxin/oral/644.pdf

APPLICATION OF MULTILAYER ACTIVATED CARBON SYSTEM FOR PCDD/F REMOVAL: REGENERATION OF ADSORBENT
Hung, P.-C., S.-H. Chang, C.-C. Ou-Yang, and M.-B. Chang.
DIOXIN 2014: The 34th International Symposium on Halogenated Persistent Organic Pollutants, 31 August - 5 September, Madrid, Spain. 4 pp, 2014

A multilayer activated carbon-adsorption system (MAS) was applied for simultaneous removal of vapor-phase PCDD/Fs and mercury from the exhaust of a small-scale pyrolysis system used to remediate dioxin/Hg-contaminated soil. Very high efficiency was obtained in removing both toxic contaminants. The authors evaluated the replacement rate of a commercial bead-shaped activated carbon (BAC) used to ensure compliance with standards of PCDD/F and mercury emissions, as well as the operating parameters for effective regeneration of the used BACs. http://mci-group.es/usbdioxin/oral/1143.pdf

PHYTOFORENSICS ON ENERGETICS: NOVEL PLANT TISSUE MEASURE APPROACH AND MODELING
Yuan, Yuan, Ph.D. dissertation, Missouri University of Science and Technology, 211 pp, 2013

Four different plants species, including woody perennial trees and monocot grasses, were planted in both soil and sand reactors in a greenhouse with continuous exposure to a mixture of explosives. Time-dependent assessments were carried out to determine kinetic mechanisms of uptake, transport, and accumulation. A dynamic soil-plant system model was developed to quantify the relationship between tissue concentration and soil pore water concentration for non-VOCs with root pathway only. The novel plant analysis method with sap extracted by freeze-centrifuge treatments was validated by a solvent extraction method on the range of plant species and tissues. The novel approach is rapid, cost-effective and labor-saving and requires no soil or water sampling. The Stella® soil-plant system model was effective in estimating the concentrations in soil pore water, plant sap, and tissue from dosing concentration input. The model can be applied to non-volatile compounds and different conditions with only minor adaption and might be the base of improvement of soil-plant system models for phytoforensics. The phytoforensic approach was validated on RDX and HMX by both experimental and simulated results. https://mospace.umsystem.edu/xmlui/bitstream/handle/10355/36257/Yuan_2013.pdf?sequence=1

A STOCHASTIC MODEL FOR ESTIMATING GROUNDWATER AND CONTAMINANT DISCHARGES FROM FRACTURED ROCK PASSIVE FLUX METER MEASUREMENTS
Acar, O., H. Klammler, K. Hatfield, M. A. Newman, M. Annable, J. Cho, B. Parker, J. Cherry, P. Pehme, P. Quinn, and R. Kroeker.
Water Resources Research, Vol 49 No 3, 1277-1291, 2013

Fractured rock aquifers are recognized as highly complex flow and transport systems, and the fractured rock passive flux meter (FRPFM) is an innovative device for simultaneous measurement of cumulative water and contaminant mass fluxes in fractures intersecting an observation well (boring). The FRPFM also is capable of indicating orientations and directions of flow in hydraulically active fractures. This paper presents a discharge estimator for when FRPFM measurements of fracture fluxes in the direction perpendicular to a transect (control plane) along one or more observation wells are available. Knowledge about the trace length distribution (commonly not available from borehole surveys) is not required for discharge estimation, although it does affect the uncertainty assessment, and equations for upper uncertainty bounds are given as an alternative. Discharge uncertainty decreases proportionally with the number of fluxes measured. Results are validated, and an example problem illustrates practical application and performancehttp://www.essie.ufl.edu/~markp/publications/Acar_etal_WRR_2013.pdf

IN SITU CHEMICAL OXIDATION OF CONTAMINATED GROUNDWATER BY PERSULFATE: DECOMPOSITION BY FE(II)- AND MN(IV)-CONTAINING OXIDES AND AQUIFER MATERIALS
Liu, H., T.A. Bruton, F.M. Doyle, and D.L. Sedlak.
Environmental Science & Technology, Vol 48 No 17, 10330-10336, 2014

In an investigation of the decomposition of persulfate in the presence of pure metal oxides, clays, and representative aquifer solids collected from field sites in the presence and absence of benzene, Fe(III) and Mn(IV) oxides catalytically converted persulfate into sulfate radical and hydroxyl radical over time scales of several weeks at rates that were two to 20 times faster than rates observed in metal-free systems. Amorphous ferrihydrite was the most reactive iron mineral with respect to persulfate decomposition. As a result of radical chain reactions, the rate of persulfate decomposition increased by as much as 100 times when benzene concentrations exceeded 0.1 mM. Due to its relatively slow rate of decomposition in the subsurface, injecting persulfate into groundwater and allowing it to migrate to zones of low hydraulic conductivity can allow clays and metal oxides to accelerate its conversion into reactive oxidants.

OXIDATIVE-REDUCTIVE PHOTODECOMPOSITION OF PERFLUOROOCTANOIC ACID IN WATER
Giri, R.R., H. Ozaki, X. Guo, R. Takanami, and S. Taniguchi.
International Journal of Environmental Science and Technology, Vol 11 No 5, 1277-1284, 2014

This article discusses the usefulness of vacuum ultraviolet (VUV) for photoreductive degradation in water of perfluorooctanoic acid (PFOA), a representative perfluorinated compound. Bench-scale tests were conducted on oxidative and reductive mineralization of PFOA using low-pressure UV lamps and potassium iodide.

EVIDENCE OF REMEDIATION-INDUCED ALTERATION OF SUBSURFACE POLY- AND PERFLUOROALKYL SUBSTANCE DISTRIBUTION AT A FORMER FIREFIGHTER TRAINING AREA
McGuire, M.E., C. Schaefer, T. Richards, W.J. Backe, J.A. Field, E. Houtz, D.L. Sedlak, J.L. Guelfo, A. Wunsch, and C.P. Higgins.
Environmental Science & Technology, Vol 48 No 12, 6644-6652, 2014

Soil and groundwater samples were collected from across a former firefighter training area to examine the extent to which remedial activities have altered the composition and spatial distribution of perfluoroalkyl substances (PFASs) in the subsurface. When compared to surface soil spatial distributions, the relative concentrations of perfluorooctanesulfonate (PFOS) and perfluoroalkyl acid (PFAA) precursors in groundwater strongly suggest that remedial activities altered the subsurface PFAS distribution, presumably through significant pumping of groundwater and transformation of precursors to PFAAs. Additional evidence for transformation of PFAA precursors during remediation included elevated ratios of perfluorohexanesulfonate to PFOS in groundwater near oxygen sparging wells.

BIODEGRADATION OF PERFLUOROOCTANESULFONATE (PFOS) AS AN EMERGING CONTAMINANT
Kwon, B.G., H.-J. Lim, S.-H. Na, B.-I. Choi, D.-S. Shin, and S.-Y. Chung.
Chemosphere, Vol 109, 221-225, 2014

Perfluorooctanesulfonate (PFOS) is a compound of global concern because of its persistence and bioaccumulation in the environment. Little is known of the potential for PFOS biodegradation. This study focused on the biodegradation of PFOS by a specific microorganism, *Pseudomonas aeruginosa*, which biodegraded ~67% of a 600 mg/L concentration of PFOS over a range of concentrations (1400-1800 µg/L) after 48 hours of incubation.

FATE AND EFFECTS OF POLY- AND PERFLUOROALKYL SUBSTANCES IN THE AQUATIC ENVIRONMENT: A REVIEW
Ahrens, L. and M. Bundschuh.
Environmental Toxicology and Chemistry, Vol 33 No 9, 1921-1929, 2014

Poly- and perfluoroalkyl substances (PFASs) are distributed ubiquitously in the aquatic environment, continuously emitted from point and nonpoint sources such as sewage treatment plants and atmospheric deposition, respectively. Perfluoroalkane sulfonates (PFSAs) and perfluoroalkyl carboxylates (PFCAs) are subject to partitioning processes in the environment: short-chain PFSAs and PFCAs are mainly distributed in the water phase, whereas long-chain PFSAs and PFCAs tend to bind to particles and have a substantial bioaccumulation potential. There are fundamental knowledge gaps about the interactive toxicity of PFAS precursors and their persistent degradation products with other natural and anthropogenic stressors.

NUMERICAL MODELING OF PERMEABLE REACTIVE BARRIERS TO TREAT HEAVY-METAL CONTAMINATED GROUNDWATER
Chalermyanont, T., P. Chetpattananondh, and N. Riyapan.
ICET 2013: The 6th PSU-UNS International Conference on Engineering and Technology, May 15-17, 2013, Novi Sad, Serbia. Paper No. T.3-1.1, p 1-5, 2013

Recent research has shown zinc contamination in the shallow groundwater at Map Ta Phut Industrial Estate, Eastern Thailand. The contaminated groundwater requires appropriate remediation lest it affect local communities. Modeling of groundwater flow and zinc transport was conducted to assess the performance of two permeable reactive barrier (PRB) configurations—a continuous PRB and a funnel-and-gate PRB—containing either zero-valent iron (ZVI) or activated sludge. 3D groundwater flow simulation results show that both PRB configurations have similar performance, but the funnel-and-gate PRB requires less operation time. The ZVI and activated sludge reactive materials achieved similar performance in removing zinc from the contaminated groundwater. http://www.psu-uns2013.com/material/papers/Session4/Session4-02407.pdf

IN-SITU TREATMENT OF GROUNDWATER CONTAMINATED WITH UNDERGROUND COAL GASIFICATION PRODUCTS
Suponik, T. and M. Lutynski.
Archives of Mining Sciences, Vol 58 No 4, 1263-1278, 2013

Contaminants generated in the underground coal gasification (UCG) process include mainly mono- and polycyclic aromatic hydrocarbons, phenols, heavy metals, cyanides, ammonia, chloride, and sulfate. Tests were conducted to determine the materials most likely to provide effective performance in treating groundwater affected by UCG if placed in a permeable reactive barrier. Results showed that granular activated carbon removed phenols, BTX, PAH, and cyanides effectively but lowered ammonia concentrations only slightly, while zeolites and scrap iron performed well in removing free cyanide, ammonia, and heavy metals.
http://www.degruyter.com/dg/viewarticle.fullcontentlink:pdfeventlink/$002fj$002famsc.2013.58.issue-4$002famsc-2013-0087$002famsc-2013-0087.pdf?t:ac=j$002famsc.2013.58.issue-4$002famsc-2013-0087$002famsc-2013-0087.xml

General News

PETROLEUM VAPOR INTRUSION: FUNDAMENTALS OF SCREENING, INVESTIGATION, AND MANAGEMENT
The Interstate Technology & Regulatory Council (ITRC) Petroleum Vapor Intrusion Team.
PVI-1, 387 pp, 2014

This document presents a method of screening petroleum-contaminated sites for potential vapor intrusion (VI) and provides tools and strategies for evaluating the VI pathway at different types of petroleum sites. The screening method is based on the "vertical screening distance," which was developed using empirical data from hundreds of petroleum-contaminated sites. Using screening distance to assess petroleum-contaminated sites allows managers to focus scarce resources on sites with greater potential for petroleum vapor intrusion (PVI). The guide provides a detailed description of the differences between PVI and chlorinated VI and then describes an eight-step process for screening, investigating, and managing sites contaminated with petroleum hydrocarbons to address the PVI pathway. *View the guide as a Web-based document or open/download it as a PDF file at* http://itrcweb.org/PetroleumVI-Guidance/

REGIONAL SCREENING TABLE USER'S GUIDE
U.S. EPA Region 3, Mid-Atlantic Risk Assessment website, May 2014

The purpose of this website is to provide default screening tables and a calculator to assist RPMs, on-scene coordinators, risk assessors, and others involved in decision-making concerning CERCLA hazardous waste sites. Users within and outside the CERCLA program should use the tables or calculator results at their own discretion and should take care to understand the assumptions incorporated in these results and apply the screening levels (SLs) appropriately. The SLs presented in the generic tables are chemical-specific concentrations for individual contaminants in air, drinking water, and soil that might warrant further investigation or site cleanup. It should be emphasized that the SLs are not cleanup standards. Special considerations are noted for a variety of contaminants, including Cr(VI), PCBs, xylenes, arsenic, TCE, and mercuric chloride and other Hg salts.http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/usersguide.htm

NUCLEAR SITE REMEDIATION AND RESTORATION DURING DECOMMISSIONING OF NUCLEAR INSTALLATIONS
OECD Nuclear Energy Agency, Task Group on Nuclear Site Restoration of the NEA Co-operative Programme on Decommissioning, NEA No. 7192, 246 pp, 2014

This report highlights key issues and lessons learned from remediation experiences of NEA member countries that may be particularly helpful to practitioners of nuclear site remediation, regulators, and site operators. It provides observations and recommendations to consider in the development of strategies and plans for efficient nuclear site remediation. http://www.oecd-nea.org/rwm/pubs/2014/7192-cpd-report.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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