Technology Innovation News Survey

Entries for August 16-31, 2015

Market/Commercialization Information

FY 2016 CONTINUATION OF SOLICITATION FOR THE OFFICE OF SCIENCE FINANCIAL ASSISTANCE PROGRAM
U.S. Department of Energy, Funding Opportunity DE-FOA-0001414, 2015

DOE's Office of Science is renewing its solicitation for grant applications in six technical program areas, among them the Biological and Environmental Research (BER) program. BER's mission is to support fundamental research and scientific user facilities to achieve a predictive understanding of complex biological, climatic, and environmental systems in order to support sustainable biofuel production, improved carbon storage, and contaminant remediation. This funding opportunity announcement covers all of the research areas in the Office of Science and is open throughout the fiscal year, until September 30, 2016, or until it is superseded by another issuance, whichever occurs first. Search for the solicitation at http://www.grants.govor search for the details at https://www.fedconnect.net under reference number DE-FOA-0001414.

REQUEST FOR INFORMATION: INDEPENDENT FIELD TESTING OF METHANE EMISSIONS DETECTION TECHNOLOGIES
DoD, Advanced Research Projects Agency - Energy (ARPA-E), DE-FOA-0001423, 2015

This announcement is a request for information only. ARPA-E is considering financial assistance for operation of a multi-user field test site (including some construction) for priority use by its Methane Observation Networks with Innovative Technology to Obtain Reductions (MONITOR) program awardees. The MONITOR program aims to support 11 project teams over three years (totaling $30M) to develop technologies focused on the detection, quantification, and localization of methane emissions. The field test site would enable MONITOR awardees to assess the performance of their technologies under realistic conditions on a simulated natural gas well pad. ARPA-E seeks input on associated capabilities, costs, and other considerations for operating the field test site. Information gathered in response to this RFI may inform the formulation of future programs. No funding opportunity exists at this time.
https://arpa-e-foa.energy.gov/#Foaldbc9dac52-16c9-4aa9-bb28-c5249f889322

Cleanup News

DRAFT SITE SD032 SHORT-TERM SOIL VAPOR EXTRACTION TEST EVALUATION, BEALE AIR FORCE BASE, CALIFORNIA: TECHNICAL MEMORANDUM
Air Force Civil Engineer Center, Project No. BAEY20127501, 168 pp, 2015

This technical memorandum provides the results of a short-term soil vapor extraction (SVE) test conducted between October 1, 2014, and January 21, 2015, at Site SD032, Beale AFB. The short-term test was conducted to evaluate the feasibility of operating the former SVE system in the northern portion of Site SD032 to address TCE concentrations detected near paired vapor extraction wells VE-4 Shallow and VE-4 Deep. The test at VE-4S/D was conducted in two phases: in Phase 1 to assess the volume/mass of TCE remaining in the subsurface near VE-4S/D and the blower requirements for Phase 2, and in Phase 2 to assess rebound, quantify mass diffusion rate, and attempt mass removal. The final rebound concentration from the short-term SVE test was 6.9 ppmv. The TCE concentration is within the range where the Central Valley Water Board previously concurred that no further remediation of vadose zone soils is required.
https://clu-in.org/download/techfocus/sve/SVE-Beale-test-2015.pdf

REVISED CORRECTIVE ACTION PLAN, MONROVIA BP/FORMER GREEN VALLEY CITGO, MONROVIA, MARYLAND
Maryland Department of the Environment (MDE), 203 pp, 2014

This active service station is attached to the end of an L-shaped shopping plaza. Dissolved MTBE and TPH-GRO are identified as the primary groundwater contaminants. Following tank removal and excavation of petroleum-contaminated soil in 2008, field feasibility tests were conducted to assess the appropriateness of soil vapor extraction (SVE), groundwater extraction, in situ flushing, and in situ chemical oxidation (ISCO). An extended ISCO/SVE field pilot conducted within the area of greatest groundwater impact used HypeAir-EX® technology, which combines ozone injection with air and low-flow hydrogen peroxide injection. During ISCO operation, significant reductions in contaminant concentrations occurred, but the system was shut down in August 2012 pending review of the presence of Cr(VI) in the groundwater. Contaminant concentrations have continued to decline since the shutdown, and an MNA remedial approach is now proposed. If MNA fails to address the site contaminants as anticipated, contingency remedies for this site include biosparging (using the ISCO wells) and short-term ISCO injection events. The cleanup goal is for all potable supply wells to meet and sustain MDE Groundwater Cleanup Standards, including the MTBE action level of 20 µg/L.
http://www.mde.state.md.us/programs/Land/OilControl/RemediationSites/Documents/FB%20Co%20-%20Green%20Valley%20Citgo%20Revised%20CAP%201.31.14%20203%20pgs.pdf

RECORD OF DECISION: PETERS DRY CLEANING STATE SUPERFUND PROJECT, LOCKPORT, NIAGARA COUNTY
New York State Department of Environmental Conservation, Site No. 932128, 53 pp, 2015

This document presents the remedy for the Peters Dry Cleaning site, a Class 2 inactive hazardous waste disposal site. The estimated present worth cost to implement the selected in situ enhanced biodegradation remedy is $734,000, combining an estimated $200,000 cost to construct and an estimated $36,000 average annual cost. The biodegradation of contaminants through anaerobic reductive dechlorination or aerobic respiration will be enhanced by injecting a biological amendment into the subsurface to promote microbe growth via an infiltration gallery, injection wells, or an alternative method. Groundwater contamination remaining after active remediation will be addressed with monitored natural attenuation. If contaminant concentrations do not decrease by an order of magnitude in a reasonable timeframe, the contingency remedial action likely would be injections of a biological amendment/microbial consortium treatment.
http://www.dec.ny.gov/chemical/93496.html

FOOD-N-FUN #18: MOTOR FUELS UST TRUST FUND PAY-FOR-PERFORMANCE SITE REMEDIATION
Underground Storage Tank and Remediation Division Annual Legislative Report, 2013-2014. Louisiana Department of Environmental Quality, 15-16, 2015

Food-N-Fun #18 is an active gasoline fueling station and convenience store located in New Iberia, Iberia Parish. Over a 4-year period, three remediation technologies were implemented to clean up underground storage tank releases of gasoline at the site: (1) a dual-phase vacuum extraction (DPVE) and recovery system to remove and treat contaminated groundwater; (2) phytoremediation to augment contaminant reduction; and (3) oxygen-enriched slurry injection to enhance biodegradation processes. The 15-well DPVE system operated from November 29, 2010, to June 11, 2012. The phytoremediation system comprised installation of 68 "tree wells" on the Food-N-Fun #18 property and an adjacent vacant lot. Poplar and ash trees ~6 ft tall were planted in 18-in boreholes drilled 16 ft bgs. An aeration tube was placed in each tree well prior to backfilling with a mixture of sand, potting soil, and topsoil. Across the street, three direct-push injection events introduced oxygen-releasing slurry into 60 boring locations on the parking lot to stimulate bioremediation throughout the zone of contamination. By September 23, 2014, 100% reduction of contamination in groundwater was observed. Confirmatory soil sampling conducted on October 1, 2014, revealed that all constituents of concern in soil were below the site-established goals. Following site restoration, LDEQ issued a No Further Action notification for the facility on January 6, 2015. http://www.deq.louisiana.gov/portal/Portals/0/RemediationServices/TAS/AnnualReport/FY14%20Annual%20Report.pdf

SOIL AND GROUNDWATER REMEDIATION TECHNOLOGIES FOR FORMER GASWORKS AND GASHOLDER SITES
CL:AIRE: Contaminated Land: Applications in Real Environments, 48 pp, 2015

This report describes key issues, contaminants, and types of site that gas distribution networks are currently facing. It also covers the main soil and groundwater in situ, ex situ, and conventional civil engineering technologies currently available to treat contaminants commonly associated with manufactured gas plants (MGPs). The report discusses soil and groundwater remediation in the UK and internationally so that lessons can be learned from other jurisdictions on how different stakeholders remediate their former MGP and gasholder facilities. http://celtic-ltd.com/wp-content/uploads/2015/07/gasworks-remediation-innovation-project.pdf

Demonstrations / Feasibility Studies

GROUNDWATER BIOREMEDIATION PILOT TEST WORK PLAN, NEVADA ENVIRONMENTAL RESPONSE TRUST SITE, HENDERSON, NEVADA
Nevada Division of Environmental Protection (NDEP), 50 pp, 2015

The overall objective of this pilot test is to evaluate the feasibility of using bioremediation installed in a well transect configuration as a remedial technology for creation of a BAZE system to treat perchlorate-contaminated groundwater migrating from the Trust Site. This revised work plan presents an updated technical approach to the previously proposed permeable reactive barrier (PRB) pilot and a scope of work for bioremediation bench- and pilot-scale tests. The salient differences between the previous work plan and the revised approach include an examination of the feasibility of bioremediation as a biologically active zone enhancement (BAZE) process, rather than testing the specific PRB concept, which by definition presumes that significant treatment occurs within the barrier itself. The bioremediation pilot test is designed to examine the potential for prolonged perchlorate treatment in groundwater via the creation of a long-term biological reducing zone. Also, Bio-Trap® In Situ Microcosms will be incorporated strategically for groundwater monitoring and evaluation as part of the actual field pilot test rather than as the first field phase prior to the pilot test. A short-term batch microcosm study is proposed in addition to the column studies proposed in the previous plan. https://ndep.nv.gov/bmi/docs/nert/Groundwater%20Bioremediation%20Pilot%20Test%20Work%20Plan_010615.pdf

REMOVAL AND RE-USE OF TAR-CONTAMINATED SEDIMENTS BY FREEZE-DREDGING AT A COKING PLANT, LULEA, SWEDEN
Rostmark, S., M. Colombo, S. Knutsson, and G. Oeberg.
Water Environment Research [submitted], 2015

Submerged tar-contaminated sediments generally are very loose, which makes remediation challenging. A modified version of freeze-dredging was tested to determine if it could be used to remove and dewater loose sediments in a canal downstream of a coking plant. PVC hoses carrying a heat medium were placed horizontally in the submerged sediments. Five days of freezing allowed straightforward removal of most of the sediments. Flat freeze cells were placed side by side in the canal to remove the rest. The freeze-thaw process increased the dry substance (DS) content from ~50% to 80%. Outdoor storage under rainy conditions did not re-wet the dried sediments. The material was used as feedstock in the coking plant, with the double cost-benefit of transportation/deposit avoided and coal consumption reduced. Results demonstrate that freeze-dredging can facilitate removal, storage, and beneficial re-use of submerged tar-contaminated sediments. *Manuscript version:*
https://lowe.ltu.se/portal/files/98616621/Rostmark_et_al_Freezing_of_tar_Sept_18_2014.docx
See additional information on freeze-dredging technology in 24 slides at
https://www.iaea.org/OurWork/ST/NE/NEFW/CFG/documents/ws022010/eng/5.7RostmarkEngl.pdf

Research

NANOFER ZVI: MORPHOLOGY, PARTICLE CHARACTERISTICS, KINETICS, AND APPLICATIONS
Eglal, M.M. and A.S. Ramamurthy.
Journal of Nanomaterials, Vol 2014, Article 152824, 11 pp, 2014

Nanofer zero-valent iron (ZVI) is a new and innovative nanomaterial capable of removing both organic and inorganic contaminants from water. The iron displays a decrease in agglomeration when it is coated with tetraethyl orthosilicate (TEOS), which imparts an increase in reactivity and stability. Nanoparticle size varies from 20 to 100 nm, and its surface area is in the range of 25-30 m^2/g. Its structure was examined before and after kinetic experiments. Results showed that adsorption of heavy metals [Pb(II), Cd(II), and Cu(II)] and TCE is very rapid during the initial step, followed by a much slower second step. Removal rates of 99.7% for Pb(II), 99.2% for Cd(II), 99.9% for Cu(II), and 99.9% for TCE were achieved in less than 180 min. Several different models were used to understand the removal mechanism associated with nanofer ZVI in an investigation of nanofer ZVI interactions with the individual metals alone and with TCE.
http://downloads.hindawi.com/journals/jnm/2014/152824.pdf
For additional information on this study, see M.M. Eglal's Ph.D. thesis at http://spectrum.library.concordia.ca/978825/1/Eglal-Ph.D-F2014.pdf

REMEDIATION OF TECHNETIUM IN VADOSE ZONE SEDIMENTS USING AMMONIA AND HYDROGEN SULFIDE GASES
Szecsody, J.E., M.J. Truex, L. Zhong, J.P. McKinley, N. Qafoku, B.D. Lee, and S.D. Saurey.
Vadose Zone Journal, Vol 14 No 7, 2015

Technetium-99 is a mobile, long-lived radionuclide and environmental risk driver at some nuclear waste sites. In an evaluation of the efficacy of using NH_3 and H_2S gases to reduce radionuclide Tc-99 mobility from subsurface soils to groundwater, individual gases were ineffective, but combined gases worked well across a range of conditions, reducing Tc-99 mobility to 14-48%. The mobile Tc-99 remaining after gas treatment may have resulted from the limited time allowed for aluminosilicates to precipitate. *See additional information in a Pacific Northwest National Laboratory report posted at* http://www.pnnl.gov/main/publications/external/technical_reports/PNNL-23665.pdf

SCALE-UP INFORMATION FOR GAS-PHASE AMMONIA TREATMENT OF URANIUM IN THE VADOSE ZONE AT THE HANFORD SITE CENTRAL PLATEAU
Truex, M.J., J.E. Szecsody, L. Zhong, J.N. Thomle, and T.C. Johnson.
PNNL-23699, 32 pp, 2014

The Deep Vadose Zone Treatability Test Plan for the Hanford Central Plateau identified gas-phase treatment and geochemical manipulation as potentially effective treatment approaches for uranium and technetium in the Hanford Central Plateau vadose zone. Tests have shown that ammonia treatment reduces the mobility of uranium, and injection of ammonia vapor was selected as the most promising uranium treatment candidate for further development and field testing. This report presents a conceptual description for field application of the ammonia treatment process, engineering calculations to support treatment design, ammonia transport information, field application monitoring approaches, and a discussion of processes affecting the fate of ammonia in the subsurface. http://www.pnnl.gov/main/publications/external/technical_reports/PNNL-23699.pdf

GRADUATED CHARACTERIZATION METHOD USING A MULTI-WELL MICROPLATE FOR REDUCING REACTIVITY OF NANOSCALE ZERO VALENT IRON MATERIALS
Hwang, Y., A. Salatas, P.D. Mines, M.H. Jakobsen, and H.R. Andersen.
Applied Catalysis B: Environmental, Vol 181, 314-320, 2016

Nanoscale zero-valent iron (NZVI) has been studied intensively for the treatment of many pollutants through reductive reaction, but quantification of NZVI reactivity has not yet been standardized. Scientists adapted colorimetric assays for determining reductive activity of NZVI and its composites with other metals. The assay quantifies reduction products to avoid interfering reactions (e.g., sorption, volatilization). Ammonium, phenol, and aniline, generated as the result of reduction of nitrate, p-halophenols, and nitrobenzene, respectively, were quantified using the same reagent for all reactions. The colorimetric assays were further adapted to the 96-well microplate format, thus minimizing sample and reagent use, as well as lowering color development time to 2 h. Applicability was demonstrated by determining the reactivity of a commercial NZVI sample and by investigating the effect of nickel content on dehalogenation.
http://orbit.dtu.dk/files/114558266/Hwang2015_wSI_ApplCatB_Graduated_characterization_for_reducing_reactivity_of_nanoscale_zero_valent_iron_materials.pdf

POTENTIAL ENVIRONMENTAL IMPLICATIONS OF NANOSCALE ZERO-VALENT IRON PARTICLES FOR ENVIRONMENTAL REMEDIATION
Jang, M.H., M. Lim, and Y.S. Hwang.
Environmental Health and Toxicology, Vol 29, 2014

This review of recent studies on the environmental applications and implications of NZVI highlights research gaps and suggests future research directions. Ecotoxicity of NZVI is reviewed according to type of organism, including bacteria, terrestrial organisms, and aquatic organisms. NZVI ecotoxicity depends on the composition, concentration, size and surface properties of the nanoparticles, and the experimental method used, as well as the species investigated. NZVI environmental fate and transport are also summarized with regard to exposure scenarios.http://www.e-eht.org/journal/view.php?number=708

USE OF INTERFACE TREATMENT TO REDUCE EMISSIONS FROM RESIDUALS IN LOWER PERMEABILITY ZONES TO GROUNDWATER FLOWING THROUGH MORE PERMEABLE ZONES
Cavanagh, Bridget, Ph.D. dissertation, Arizona State University, 372 pp, 2014

In situ chemical oxidation (ISCO) treatment of hydrocarbon contamination in layered subsurface zones was evaluated using hydrogen peroxide (H_2O_2) and sodium persulfate. H_2O_2 studies included lab and field-scale distribution studies and lab emission reduction experiments. The reaction rate of H_2O_2 in soils was so fast it did not travel far (60 days in field and lab studies. During that period, the lab studies showed reduced hydrocarbon impacts, presumably from aerobic biodegradation, which rebounded once the O_2 source depleted, suggesting that field monitoring should extend beyond the post-treatment elevated DO. Persulfate use was studied in 2D tanks containing two contrasting permeability layers (a three orders of magnitude difference). The dissolved-sorbed source tank was actively treated for 14 d, and 200 d after treatment, the emission reduction of BTEX was 95-99% and MTBE was 63%. After three persulfate and two sodium hydroxide applications for peroxydisulfate ion base activation in the LNAPL source tank, the resulting emission reductions for BTEX, n-propylbenzene, and 1,3,5-trimethylbenzene were 55-73%. While less effective at reducing emissions from

LNAPL sources, the 14-d treatment delivered sufficient peroxydisulfate ion through diffusion to remediate BTEX from the 60-cm dissolved-sorbed source. Overall peroxydisulfate ion utilization in the dissolved source experiment was calculated by mass balance to be 108-125 g peroxydisulfate ion per g hydrocarbon treated. http://repository.asu.edu/attachments/134986/content/Cavanagh_asu_0010E_13899.pdf

ASSESSING CONTAMINANT-REMOVAL CONDITIONS AND PLUME PERSISTENCE THROUGH ANALYSIS OF DATA FROM LONG-TERM PUMP-AND-TREAT OPERATIONS
Brusseau, M.L. and Z. Guo.
Journal of Contaminant Hydrology, Vol 164, 16-24, 2014

Historical groundwater-withdrawal and contaminant-concentration data collected from long-term pump-and-treat operations were analyzed and used to examine contaminant mass discharge (CMD) and mass-removal behavior for multiple sites. While CMD exhibited a relatively rapid decline during the initial stage of operation for all three sites, the rate of decline varied. The greatest rate was observed for the PGN site, whereas the lowest rate was observed for the MOT site. In addition, the MOT site exhibited the lowest relative reduction in CMD. These results are consistent with the actuality that the MOT site likely contains the greatest proportion of poorly accessible contaminant mass, given that it comprises a combined alluvium and fractured-bedrock system in which solvent and dissolved mass are present directly in the bedrock. The relative contributions of the source zones versus the plumes to total CMD were determined. Constrained contaminant mass removal was observed to influence the plumes for all three sites, and was attributed to a combination of uncontrolled (or imperfectly controlled) sources, back diffusion, and well-field hydraulics. The results presented herein illustrate that detailed analysis of operational pump-and-treat data can be a cost-effective method for providing value-added characterization of contaminated sites. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4117718/

ARSENIC IMMOBILIZATION BY NANOSCALE ZERO-VALENT IRON
Rodova, A., J. Filip, and M. Cernik.
Ecological Chemistry and Engineering S, Vol 22 No 1, 45-59, 2015

Contaminated mine water (~85 mg/dm^3 arsenic) from the Kank site (Czech Republic) was tested in a reaction with elemental iron nanoparticles. Oxidation of elemental iron creates oxyhydroxides, which incorporate As into their structure in the form of mixed complexes and thereby remove and bind dissolved As from the solution. The addition of 0.5 g/dm^3 NZVI to the contaminated water led to a significant decrease in oxidation-reduction potential and reduced As concentrations to around the detection limit. NZVI addition did not affect the pH of the solution significantly. Phosphates represent the main competing anion for coprecipitation; after NZVI addition, their concentration declined to 6.5% of the original value. Analysis of the resulting precipitates confirmed the presence of jarosite, Schwertmannite, and arsenic, probably in the form of skorodite.
http://www.degruyter.com/dg/viewarticle.fullcontentlink:pdfeventlink/$002fj$002feces.2015.22.issue-1$002feces-2015-0002$002feces-2015-0002.pdf?t:ac=j$002feces.2015.22.issue-1$002feces-2015-0002$002feces-2015-0002.xml

REDUCTIVE DEGRADATION OF PERFLUORINATED COMPOUNDS IN WATER USING MG-AMINOCLAY COATED NANOSCALE ZERO VALENT IRON
Arvaniti, O.S., Y. Hwang, H.R. Andersen, A.S. Stasinakis, N.S. Thomaidis, and M. Aloupi.
Chemical Engineering Journal, Vol 262, 133-139, 2015

Various perfluorinated compounds (PFCs) [perfluorooctanoic acid (PFOA); perfluorononanoic acid (PFNA); perfluorodecanoic acid (PFDA); and perfluorooctane sulfonate (PFOS)] were removed from water by different types of nanoscale zero-valent iron (NZVI). Batch experiments showed that an iron dose of 1 g/L in the form of Mg-aminoclay (MgAC)-coated NZVI effectively removed 38-96% of individual PFCs at an initial pH of 3.0, with an order of removal efficiency of PFOS ≈ PFDA > PFNA > PFOA. PFCs removal was http://orbit.dtu.dk/ws/files/101280775/Arvaniti2014_Post_print_Reductive_Degradation_of_Perfluorinated_Compounds_in_Water_using_Mg_aminoclay_coated_Nanoscale_Zero_Valent_Iron.pdf

MICROBIAL DYNAMICS DURING AND AFTER IN SITU CHEMICAL OXIDATION OF CHLORINATED SOLVENTS
Sutton, N.B., S. Atashgahi, J. van der Wal, G. Wijn, T. Grotenhuis, H. Smidt, and H.H. Rijnaarts. Ground Water, Vol 53 No 2, 261-270, 2015

Researchers used quantitative PCR (qPCR) to monitor the abundance of organohalide-respiring bacteria (OHRB: *Dehalococcoides mccartyi*, *Dehalobacter*, *Geobacter*, and *Desulfitobacterium*) and reductive dehalogenase genes (rdh: tceA, vcrA, and bvcA) at a field location contaminated with chlorinated solvents prior to and following in situ chemical oxidation with sodium persulfate. Natural attenuation of PCE and TCE observed prior to ISCO was confirmed by the distribution of OHRB and rdh genes. In wells affected by persulfate treatment, a 1 to 3 order of magnitude reduction in OHRB abundance and complete absence of rdh genes was observed 21 days after ISCO. Groundwater acidification (pH500 mV) following ISCO were significant and contributed to disruption of the microbial community. In wells mildly affected by persulfate, a slight stimulation of the microbial community was observed, with more than an order of magnitude increase in the abundance of *Geobacter* and *Desulfitobacterium* 36 days after ISCO. After six months, regeneration of the OHRB community occurred, but neither *D. mccartyi* nor any rdh genes were observed, indicating extended disruption of biological natural attenuation capacity. If additional time proves insufficient for full restoration of biological activity, electron donor amendment or bioaugmentation may be required. *For additional information on this study, see N.B. Sutton's Ph.D. thesis at* http://library.wur.nl/WebQuery/groenekennis/2060828.

COMPARATIVE STUDY OF SITE INVESTIGATION APPROACHES AND POTENTIAL IN SITU REMEDIATION TECHNIQUES: MODEL-ASSISTED EVALUATION OF ADVANTAGES AND UNCERTAINTIES
Martac, E., S. Trapp, L. Clausen, et al.
TIMBRE Project, WP4 D4.5, 62 pp, 2014

This report discusses innovative remediation and characterization technologies that were investigated over the course of the TIMBRE project. Soil washing, phytoremediation, in situ chemical oxidation with bioremediation, in situ bioremediation with vapor extraction, and soil flushing with air sparging were implemented at the test sites. Tree coring (phytoscreening), leaching tests for soil characterization, and direct push-based technologies such as shallow soil probing, cone penetration testing, soil gas measurement, hydraulic profiling, electrical conductivity probe, membrane interface probe, and laser-induced fluorescence were among the characterization technologies tested. Site models were developed to provide a comparative assessment of possible in situ remediation techniques and identify which measures might or might not be successful at the study sites.
http://www.timbre-project.eu/tl_files/timbre/Intern/4%20Work%20Packages/WP4/timbre_265364_D4.5_V3.pdf

GEOCHEMICAL MODELING OF TRIVALENT CHROMIUM MIGRATION IN SALINE-SODIC SOIL DURING LASAGNA PROCESS: IMPACT ON SOIL PHYSICOCHEMICAL PROPERTIES
Lukman, S., A. Bukhari, M.H. Al-Malack, N.D. Mu'azu, and M.H. Essa.
Scientific World Journal, 272794, 2014

It is difficult to remove Cr(III) from soil using electrokinetics because of its geochemical properties. Soil of a high buffering capacity is likely to reduce the mobility of Cr(III) and subsequently reduce remedial efficiency. Researchers investigated and modeled Cr(III) migration in saline-sodic soil (high buffering capacity and alkaline) during integrated electrokinetics-adsorption remediation (i.e., the Lasagna process) as they evaluated Cr(III) remedial efficiency and the impacts of the Lasagna process on soil physicochemical properties. Under optimal conditions of 0.36?V/cm voltage gradient; 17.63?hr polarity reversal rate; and 10.0 soil pH, the expected Cr(III) remedial efficiency is 64.75%.
http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4131513/

General News

RISK-BASED MANAGEMENT OF MERCURY-IMPACTED SITES
Phipps, O., J. Barrett, P. Hesketh, and R. Brown.
NICOLE: Network for Industrially Contaminated Land in Europe, 68 pp, 2015

Hg typically is found as a principal pollutant for only a few specific industries, such as chlor-alkali plants, where the majority of the Hg impacts identified in surrounding soils typically comprise the original elemental form of Hg, often at relatively high concentrations (e.g., 100-1000 mg/kg). Mercury also has been used as a key reactant in the production of organic compounds, such as the synthesis of vinyl chloride and acetaldehyde from acetylene. Hg may be present at other industrial sites as a secondary pollutant at relatively low concentrations, such as 1-10 mg/kg Hg levels in coal-tar contaminated soil at gas and coking works. This report was prepared to share current information, eight brief case studies, and best practices for characterization and management of Hg-contaminated soil and groundwater at industrial sites. http://www.erm.com/globalassets/documents/publications/2015/circle-mercury-brochure.pdf

GUIDANCE FOR DESIGN, INSTALLATION AND OPERATION OF IN SITU AIR SPARGING SYSTEMS
Wisconsin Department of Natural Resources (DNR), RR-186, 49 pp, 2015

In situ air sparging is a process in which a gaseous medium (commonly air) is injected into groundwater through a system of wells. As the injected air rises to the water table, it can strip VOCs from groundwater and the capillary fringe. The process also oxygenates groundwater, enhancing the potential for biodegradation at sites with contaminants that degrade aerobically. The Wisconsin DNR developed this guidance for environmental professionals who investigate contaminated sites and design remedial systems. A working knowledge of geology, hydrogeology, and basic engineering is required to design an effective system. Given that each site is unique with respect to contaminants, access constraints, size, hydrogeology, and other characteristics, designers may deviate from the guidance depending upon site-specific circumstances. http://dnr.wi.gov/files/pdf/pubs/rr/rr186.pdf

NAVFAC TECHNICAL MEMORANDUM ON VAPOR INTRUSION PASSIVE SAMPLING
Dawson, H., T. McAlary, and H. Groenevelt.
NAVFAC Technical Memorandum TM-NAVFAC EXWC-EV-1503, 20 pp, 2015

This technical memorandum was prepared for NAVFAC Remedial Project Managers, contractors, and other stakeholders to provide an overview of the use of passive samplers for vapor intrusion applications. It describes the basics of passive sampler theory and design, the available types of passive samplers, the advantages and limitations of passive samplers, and important considerations when implementing a passive sampling program. Results from two vapor intrusion case studies at DoD sites are highlighted.
http://www.navfac.navy.mil/content/dam/navfac/Specialty%20Centers/Engineering%20and%20Expeditionary%20Warfare%20Center/Environmental/Restoration/er_pdfs/v/navfacexwc-ev-tm-vi-passive-sampling-201507.pdf

U.S. EPA PROCEEDINGS OF NATIONAL CONFERENCE ON MINING-INFLUENCED WATERS: APPROACHES FOR CHARACTERIZATION, SOURCE CONTROL AND TREATMENT
Bless, D. and D. Grosse (eds.). EPA 600-R-15-088, 93 pp, 2015

In 2014, EPA's Office of Research and Development sponsored a conference in Albuquerque, New Mexico, on August 12-14 to provide a forum for the exchange of scientific information on current and emerging approaches to characterization, monitoring, source control, treatment, and remediation of mining-influenced waters. The conference was aimed at mining remediation researchers and practitioners; federal, state, local, and tribal decision-makers; the mining industry; and others interested in the management, remediation, and restoration of waters affected by hardrock mining. This publication contains the presentation abstracts and speaker biographies. http://nepis.epa.gov/Adobe/PDF/P100MV2A.pdf
Additionally, many of the presentation PDF files are posted at https://clu-in.org/issues/default.focus/sec/Characterization,_Cleanup,_and_Revitalization_of_Mining_Sites/cat/Conference_Proceedings_and_Presentations/.

DIRECT-PUSH TECHNOLOGY
OVAM, CityChlor Project: Integrated Approach for Urban Development, 42 pp, 2014

This document was developed to provide a balanced overview of the advantages and disadvantages of direct-push technologies (DPTs), focusing on tools relevant to chlorinated solvent contamination. As the equipment is still rapidly evolving, this document cannot offer a complete overview of all tools manufactured by specific companies. New tools are being developed, and existing equipment is used in creative ways to meet site-specific conditions. Following an overview of techniques for sampling and in situ measurement that can be applied by DP, case studies illustrate their use in soil investigation and remediation. http://www.citychlor.eu/sites/default/files/direct-push_technology.pdf

DRAFT TOXICOLOGICAL PROFILE FOR PERFLUOROALKYLS
Agency for Toxic Substances and Disease Registry (ATSDR), 574 pp, 2015

Perfluoroalkyls (also referred to as perfluorinated compounds, or PFCs) are a family of human-made chemicals that do not occur naturally in the environment. Perfluoroalkyls, unique because they repel oil, grease, and water, have been used in surface protection products, such as carpet and clothing treatments and coatings for paper and cardboard packaging. Some perfluoroalkyls have also been used in fire-fighting foams. The 13 perfluoroalkyls discussed in this profile, especially perfluorooctane sulfonic acid (PFOS) and perfluorooctanoic acid (PFOA), have been detected in air, water, and soil. EPA has recommended provisional drinking water health advisories of 0.4 µg/L for PFOA and 0.2 µg/L for PFOS. This public health statement summarizes ATSDR's findings on perfluoroalkyls, describes them and the effects of exposure, and explains how to limit that exposure. The public comment period for this draft toxicological profile ends December 1, 2015.
http://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=1117&tid=237

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

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