

Technology Innovation News Survey

Entries for May 16-31, 2015

Market/Commercialization Information

ABANDONED MINE LANDS REMEDIATION

Department of Agriculture, Forest Service, R-3 Southwestern Region, Albuquerque, NM.
Federal Business Opportunities, FBO-4949, Solicitation AG-8371-S-15-0011, 2015

The U.S. Forest Service has opened a small business competitive procurement for remediation of hazards associated with abandoned mine lands within the Southwestern Region. The Government intends to award up to five IDIQ-type contracts from this solicitation. The IDIQs will be for one base year with the potential exercise of up to four option years. Responses are due by 2:30 PM Mountain Time, August 4, 2015.
<https://www.fbo.gov/ops/onestop/buyers-event/navfac-small-business-industry-market-research-event/>

NAVFAC NW SB INDUSTRY AND MARKET RESEARCH DAY

Department of the Navy, Naval Facilities Engineering Command, Silverdale, WA.
Federal Business Opportunities, FBO-4964, Solicitation N44255-15-SB-INDUSTRYDAY, 2015

The NAVFAC Northwest Office of Small Business Programs is hosting an Industry and Market Research Day on August 10, 2015, 9:00 AM - 12:00 PM. Check-in begins at 8:30 at the Keyport Museum, 1 Garnett Way, Keyport, Washington. This annual opportunity allows small businesses to present their experience and capabilities to NAVFAC technical representatives and contracting officers. Environmental Remediation Services, NAICS code 562910, is among NAVFAC Northwest's current areas of interest. Prime contractors will be available to discuss potential subcontracting opportunities. Registration opens June 30, 2015, at <https://www.fbo.gov/ops/DON/NAVFAC/N44255/N4425515SB-INDUSTRYDAY/Listing.html>. Only the first 70 firms verified to meet the requirements will be offered a time slot. Registration requires a Cage code.

SUPERFUND RESEARCH PROGRAM OCCUPATIONAL AND SAFETY EDUCATION PROGRAMS ON EMERGING TECHNOLOGIES (R25)

National Institute of Environmental Health Sciences (NIEHS) Funding Opportunity RFA-ES-15-014, 2015

The over-arching goal of the Occupational and Safety Education Programs on Emerging Technologies is to support educational activities that complement and/or enhance workforce training. This funding opportunity will provide institutions of higher education the opportunity to develop continuing education and academic curricula on occupational health and safety management practices in the areas of emerging technologies (e.g., emerging hazardous waste products, green chemistry, sustainable remediation, and detection technologies) to industrial hygienists and graduate students involved in the research, evaluation, management, and handling of hazardous substances. The window of opportunity for submissions begins September 20 and ends October 20, 2015, by 5:00 PM local time of applicant organization. <http://grants.nih.gov/grants/outline/rfa-files/RFA-ES-15-014.html#sthash.bf6c6w72.dpuf>

Cleanup News

REMEDIAL PERFORMANCE EVALUATION OF DUAL PRBS INSTALLED IN A HISTORICAL ARROYO

Kempf, A.D., A.C. Griffin, and G. Leone.

Abstracts: NGWA Groundwater Summit 2014, 4-7 May, Denver, Colorado.

Historical lead and copper smelting operations conducted over 100-plus years released arsenic to site groundwater. Groundwater flow and the majority of arsenic mass flux are concentrated in buried arroyos at the site. In the largest arroyo, two zero-valent iron (ZVI) permeable reactive barriers (PRBs) were constructed in series for passive groundwater treatment. Predisign activities included column tests to determine the site-specific ZVI groundwater arsenic uptake characteristics as well as detailed hydrogeologic and contaminant characterizations. The site arroyos consist of coarse alluvial deposits, and the resulting high permeability and high flux groundwater flow system required PRB designs of high permeability and width, and iron content consistent with contaminant loading rates and desired treatment longevity. PRBs were constructed of a ZVI and sand backfill with a hydraulic conductivity >1000 ft/day and were ~8 ft thick to provide sufficient residence contact and meet the targeted design lifetime. Monitoring results indicate the PRBs are intercepting groundwater and reducing arsenic groundwater concentrations. For background information on this installation, see the report http://www.recastingthespelter.com/wp-content/themes/recastingasarco/downloads/site_documents/CompletePRBDemoZVIIron8x11-11-15-2014.pdf.

INNOVATIVE FIELD MONITORING: LEGACY SUCCESSSES AND THE FUTURE OF LONG-TERM MONITORING

Myers, J.C., D. Hoffman, and M. Boerstein.

WM2014: Waste Management Conference, March 2-6, Phoenix, AZ, Paper 14571, 2014

Past experience demonstrates how the value of more complete data sets provided by field analytical devices can outweigh lower levels of data quality. A case study using field analytical data from a DOE National Environmental Technology Laboratory deployment to monitor impacts of acid mine drainage illustrates the utility of increased data volumes. <http://www.wmsvm.org/archives/2014/papers/14571.pdf>

SYSTEMS-BASED FRAMEWORK FOR REMEDIATION ENDPOINTS

Lee, H., M. Truex, D. Wellman, M. Freshley, D. Katzman, V. Vesselinov, M. Denham, A. Bunn, C. Eddy-Dilek, J. Morse, M. Thompson, E. Pierce, S. Chamberlain, and K. Gerdes.

WM2014: Waste Management Conference, March 2-6, Phoenix, AZ, Paper 14355, 2015

A framework has been developed for evaluating soil and groundwater remediation at complex sites. The framework provides a structured, systems-based technical approach intended for application to remediation processes established under CERCLA and RCRA. The approach aims to facilitate remedy decisions and implementation at complex sites where complete restoration may be uncertain, require long time frames, or involve use of progressive and adaptive management approaches. A foundation of the approach is a systems-based conceptual model. The model describes a site's associated system of features, events, and processes that collectively describe contaminant behavior, remedy performance, and control of exposure pathways. <http://www.wmsvm.org/archives/2014/papers/14355.pdf>

CONCLUDING A STEAM INJECTION REMEDIATION PROJECT AT A DENSE NON-AQUEOUS PHASE LIQUID SOURCE ZONE AT THE SAVANNAH RIVER SITE

Kramer, B.J., J. Kujar, J. Ross, J. Cardoso-Neto, D.G. Jackson, B.B. Looney, and K.M. Adams.

WM2015: Waste Management Conference, March 15-19, Phoenix, AZ, Paper 15303, 2015

Steam injection was selected to remediate the DNAPL source zone at the SRS M-Area Settling Basin in a treatment area with a 3-acre footprint and target depths of 45-165 ft in unconsolidated sand, silt, and clay. The remediation system comprised 96 vertical, horizontal, and angled steam injection and soil vapor extraction wells, plus a thermal monitoring system. Operation began in August 2005. Steam injection was first applied to the deep vadose zone, progressed to the aquifer zone, and then followed with the mid-vadose zone. Multiple steam strategies were utilized to enhance mass removal. Steaming ended in 2009. Soil vapor extraction is ongoing, with residual temperatures in the deep low permeability zones still >150°F and over 450,000 lb of VOCs removed to date. Assessment of vapor concentrations in the target zone allowed abandonment of one-third of the extraction wells and conversion of another third of the extraction wells to passive solar-operated vapor extraction equipment. <http://www.oast.gov/scitech/nhibio/1177004>

25 YEARS OF ENVIRONMENTAL REMEDIATION IN THE GENERAL SEPARATIONS AREA OF THE SAVANNAH RIVER SITE: LESSONS LEARNED ABOUT WHAT WORKED AND WHAT DID NOT WORK IN SOIL AND GROUNDWATER CLEANUP

Lewis, C. and G. Blount.

WM2015: Waste Management Conference, March 15-19, Phoenix, AZ, Paper 15270, 2015

During 25 years of environmental remediation in the General Separations Area (GSA), SRS stabilized and capped seepage basins, consolidated and capped waste units and burial grounds, installed groundwater pump-and-treat systems, constructed deep subsurface barriers to manage groundwater flow, conducted in situ chemical treatments, and captured contaminated groundwater discharges at the surface for management in a forest irrigation system. Over the last 25 years, contaminant concentrations in the aquifers and in GSA surface water streams dropped significantly, 65 waste sites and four RCRA facilities reached closure, and environmental cleanup has progressed to the stage where most of the work involves monitoring, optimization, and maintenance of existing remedial systems. Many lessons have been learned in the process (e.g., geotextile covers outperform low-permeability clay caps, especially with respect to the repairs required in upkeep of the drainage layers as the caps age). SRS invested ~\$50 million in construction in two pump-and-treat systems and ~\$100 million in six years of operation only to find the systems were ineffective. One system was replaced by a series of subsurface barrier groundwater remediation systems, the other system was replaced by a funnel-and-gate subsurface barrier system augmented by chemical treatment within the gates. The mostly passive replacement systems, which cost ~\$13 million to construct, reduced tritium flux to Fourmile Branch by over 70%. <http://www.oast.gov/scitech/nhibio/1177005>

Demonstrations / Feasibility Studies

A SIMPLIFIED ANAEROBIC BIOREACTOR FOR THE TREATMENT OF SELENIUM-LADEN DISCHARGES FROM NON-ACIDIC, END-PIT LAKES

Luek, A., C. Brock, D.J. Rowan, and J.B. Rasmussen.

Mine Water Environment, Vol 33, 295-306, 2014

This pilot project assessed the suitability of a bioreactor system to treat non-acidic coal mine effluent containing 85 µg/L of Se while making the system as economical as possible by using locally available materials. Conducted near Grande Cache, Alberta, Canada, the pilot effectively reduced Se concentration in non-acidic mine water by 95% in the field, even in water at 2°C. Successful Se removal required an aquatic anoxic environment, organic matter to provide a carbon and nitrogen source as a bacterial substrate, and sulfur/Se-reducing bacteria. These prerequisites were met while keeping overall costs of reactor construction and maintenance comparatively low by using easily accessible organic substrate matter and integrating simple building materials into the landscape. The results are promising for larger-scale applications. The use of existing industrial structures, such as settling ponds or small end-pit lakes, can make increases in case feasible and support integration of mine remediation processes. <http://link.springer.com/content/pdf/10.1007/s75102-014-0296-z.pdf>

TREATMENT OF METALS AND DISSOLVED SALTS BY ENHANCED CHEMICAL PRECIPITATION AND NANOFILTRATION

Bull, B., P. Prakash, D. Engert, J. Easton, and J. Staud.

SME Annual Conference & Expo -- CMA 117th National Western Mining Conference, 15-18 February 2015, Denver, Colorado, Abstracts, p 95, 2015

An economical treatment process combining enhanced chemical precipitation with nanofiltration was tested successfully in a 20-gpm pilot-scale water treatment plant installed at a hard rock mine and operated for 4 months treating representative inflows. Waters were pretreated by iron co-precipitation at pH 5.5 with an iron to molybdenum (Fe:Mo) ratio of 7:1 to remove molybdenum. Super-saturation of gypsum and calcium fluoride were achieved in the nanofiltrate concentrate stream. Key parameters for effective and economical desaturation and removal of sulfate, TDS, and fluoride were determined. With concentrate recycle, overall membrane recoveries for treatment of mine waters ranged between 85-90%, and influent sulfate of 1,300 mg/L declined to 300 mg/L, well below the treatment goal of 600 mg/L.

FIELD DEMONSTRATION PROJECT: STEAM ENHANCED REMEDIATION, GREENWICH MOHAWK SITE, CITY OF BRANTFORD, ONTARIO, CANADA

Veenis, Y.M.M. and R.K. Helling, City of Brantford, 40 pp, 2014

Between September 16 and October 25, 2013, a steam-enhanced field demonstration was conducted in a thermal treatment zone of ~150 m² to address mainly TPH and lesser amounts of creosote tar at a former manufacturing property located in Brantford, Ontario. The project demonstrated that (1) steam-enhanced extraction can be implemented safely at the site, near residential zones, without causing nuisance to residents; (2) free-phase product can be removed quickly and in high quantities; (3) mass removal relative to the amount of steam used is significantly better in the field than in the lab; and (4) the volatile and light hydrocarbons (F1) can be fully removed from the soil and groundwater, whereas removal of heavier hydrocarbons (F3 and F4) is less efficient. A total of 65 tons of steam was injected, which equals one pore volume of water. The number of pore volume flushes required to meet the residual petroleum hydrocarbon concentration is calculated to be about 12-13 pore volume flushes. Total project cost for lab study and field demonstration was \$261,690. <http://www.brantford.ca/projects%20initiatives%20Remediation%20Demonstration%20PR/groundwater%20Technology/Steam%20Demonstration%20Brantford%20FINAL-2014-report.pdf>

OUI CENTRAL GROUNDWATER PLUME PERMEABLE REACTIVE BARRIER PILOT STUDY

Site Management Plan, Fiscal Year 2015: Marine Corps Air Station Cherry Point, Cherry Point, North Carolina. Chapter 5, p 6-7, & Chapter 9, p 3, 2014

In March 2011, construction of a pilot PRB began in the downgradient portion of the OUI Central Groundwater Plume (mainly TCE constituents) near East Prong Slocum Creek at MCAS Cherry Point. Installation of the PRB and monitoring wells was completed in August and September 2012. The 600-ft PRB contains a combination of zero-valent iron (ZVI) and sand. The pilot had two objectives: (1) evaluate the site-specific effectiveness of a PRB for reducing contaminant concentrations in the downgradient portion of the OUI plume in order to protect surface water and sediment in the creek and (2) determine if currently available trenching and PRB installation technology could achieve a target depth of 45 ft at the site. Significant contaminant reductions were observed downgradient of the PRB in the surficial aquifer; however, the pilot revealed that 35 ft is the maximum attainable trenching and installation depth at the site using currently available technology. The preferred remedy in the proposed plan for the OUI Central Groundwater Plume sites (finalized April 2014) consists of in situ enhanced bioremediation in the upgradient source zone, two ZVI PRBs in the downgradient zone, monitored natural attenuation and land use controls across the full extent of the plume, and subsurface soil vapor and indoor air monitoring in selected buildings.

ARSENIC FATE FOLLOWING IN-SITU SULFATE REDUCTION: ASSESSING THE SUSTAINABILITY OF A PROMISING GROUNDWATER REMEDIATION STRATEGY

Neumann, R.B. and J.A. Jay.

State of Washington Water Resources Research Center, Project 2013WA374B, 12 pp, 2015

This project's objective is to advance understanding of the long-term sustainability of arsenic removal from groundwater following field-scale application of induced microbial sulfate reduction with and without addition of zero-valent iron (ZVI). Washington State has one of the few field applications of induced microbial sulfate reduction, where the Department of Ecology oversees application of the technique (with and without ZVI) in permeable reactive barriers (PRBs) installed at the BBL Woodwaste site to remediate the leading edges of a groundwater arsenic plume. From the mid-1970s until the early 1980s, the unlined landfill received woodwaste contaminated with slag from the former Asarco smelter in Ruston. The Asarco slag contained up to 2% arsenic, and biogeochemical conditions within the base of the landfill produced a redox-driven release of arsenic that formed a large groundwater arsenic plume whose current concentrations reach ~5,000 µg/L—one thousand times the site's background concentration of 5 µg/L. The applied ZVI decreased arsenic concentrations within the PRBs by 66-96% and maintained low arsenic concentrations over a period of ~2 years. Remediation without ZVI had more limited success; concentrations initially decreased but then increased again. <http://www.wsu.edu/documents/2015/05/2013wa374b.pdf>

Research

NEW APPROACHES FOR LOW-INVASIVE CONTAMINATED SITE CHARACTERIZATION, MONITORING AND MODELLING

French, H.K., M. Kaestner, and S.E.A.T.M. van der Zee.

Environmental Science and Pollution Research, Vol 21 No 15, 8893-8896, 2014

This paper briefly discusses characterization and monitoring improvements developed under the European Commission 7th Framework program, such as ModelPROBE: Model-driven Soil Probing, Site Assessment and Evaluation, and instances of noninvasive technology and methods. <http://link.springer.com/content/pdf/10.1007/s2511-1356-014-2840-9.pdf>

TEMPERATURE AS A TOOL TO EVALUATE AEROBIC BIODEGRADATION IN HYDROCARBON CONTAMINATED SOIL

Sweeney, R.E. and G.T. Ririe.

Groundwater Monitoring & Remediation, Vol 34 No 3, 41-50, 2014

This paper presents the theory and some practical aspects of using temperature measurements to assess aerobic biodegradation in hydrocarbon-contaminated soil. The method uses two noninvasive procedures for measuring vertical temperature profiles down to a depth of 1 m by a thermistor on a cable for one-time measurements and (2) compact temperature data loggers deployed for a period of 3-12 months. The vertical temperature profile measurements indicate the depth and lateral extent of biodegradation and show seasonal temperature changes throughout the year. The theory for using temperature measurements to estimate the minimum rate of biodegradation is applied to an evaluation of field measurements from sites in California where natural biodegradation of spilled petroleum hydrocarbons is underway. Temperature data also are used to evaluate the relative rates of biodegradation due to natural processes and soil vapor extraction at a former refinery site. In addition to its application as a simple, cost-effective tool for quantifying the rate of biodegradation in soil, the temperature method can be used to optimize remediation systems and evaluate their performance at hydrocarbon spill sites.

ECOLOGICAL MECHANISMS AND EFFECTIVENESS OF BIOREMEDIATION IN ALASKA

Leevis, Mary-Cathrine C.E., Ph.D. thesis, University of Alaska Fairbanks, 204 pp, 2014

An investigation of the mechanisms and effectiveness of microbial communities and native boreal vegetation for contaminant degradation and biogeochemical cycling was conducted in three different soil systems to understand how dominant vegetation type, historical treatment, and contamination shape microbial community structure and functional potential. Stable isotope probing was used to understand how microbial communities act in concert to biotransform PCBs. Additionally, a forensic investigation was conducted to assess the long-term effects of phytoremediation on soil petroleum concentrations, microbial community, and vegetation colonization at a petroleum-contaminated site not actively managed for 15 years. The results demonstrate that phytotechnologies using native and local plants can remediate petroleum-contaminated soils effectively. <https://doi.org/10.1127/0145-8454>

CHARACTERIZATION OF BIOFILM IN 200W FLUIDIZED BED REACTORS

Lee, M.H., S.D. Saurey, B.D. Lee, K.E. Parker, E.E.R. Eisenhauer, E.A. Cordova, and E.C. Golovich. PNNL-23679, 93 pp, 2014

Contaminated groundwater beneath the 200 West Area at DOE's Hanford facility contains organics, inorganics, radionuclides, and metals. A granular activated carbon-based fluidized bed reactor (FBR) was added alongside the existing pump-and-treat system to remove nitrate, Cr(VI), and carbon tetrachloride. Although many of the contaminants initially declined below cleanup levels, the FBR began to experience operational upsets, such as carbon carry-over, over-production of biofilm, and over-production of hydrogen sulfide. In an investigation of the microbial community present in the FBR over time, findings from terminal restriction fragment length polymorphism analysis, quantitative polymerase chain reaction, and fluorescent *in situ* hybridization analyses indicated that the microbial community within the ailing FBR was completely different from the original inoculation community and likely was from the groundwater. Early analyses showed an FBR community dominated by a few *Curvibacter* and *Flavobacterium* species, whereas by the final sample the microbial community was more diverse. http://www.pnl.gov/main/publications/external/technical_reports/PNNL-23679.pdf

IN-SITU SONICATION FOR ENHANCED RECOVERY OF AQUIFER MICROBIAL COMMUNITIES

Ugolini, R., R. Heinzeberger, H. Buergermann, J. Zeyer, and M.H. Schroth.

Groundwater, Vol 52 No 5, 737-747, 2014

Sampling methods for characterization of microbial communities in aquifers should target both suspended and attached microorganisms (biofilms). In an investigation of the effectiveness and reproducibility of low-frequency (200 Hz) sonication pulses on improving extraction efficiency and quality of microorganisms from a petroleum-contaminated aquifer in Studen (Switzerland), application of sonication pulses at different power levels (0.65, 0.9, and 1.1 kW) to three different groundwater monitoring wells enhanced cell concentration extraction efficiency up to 13-fold, with most of the biomass associated with the sediment fines extracted with groundwater. Higher powered pulses gave better results in extraction efficiency and quality.

DEVELOPMENT OF A NEW GREEN TECHNOLOGY FOR THE REVEGETATION OF ABANDONED GOLD MINE TAILINGS USING SPECIFIC SYMBIONTS ASSOCIATED WITH *PICEA GLAUCA*

Nadeau, Martin Beaudoin, Master's thesis, Laval University, Quebec, Canada, 185 pp, 2015

The role and importance of plant growth-promoting rhizobacteria (PGPR) and ectomycorrhizal (ECM) fungi in promoting the health, growth, and nutrition of *Picea glauca* (white spruce) were investigated on biotite-quartz-rich waste rocks and fine tailings of the Sigman, anaxas gem mine, located in the Abitibi region of Canada. The community structure of ECM fungi species was analyzed on four locations near the mining site and then a lab experiment was conducted to select, *in vitro*, promising ECM fungi that grow well on tailings. Finally, a greenhouse study of the growth of *P. glauca* seedlings on waste rocks and fine tailings was conducted to evaluate the performance of different ECM fungi and PGPR treatments. Results suggest that site-adapted ECM fungi and PGPR play a very important role in the health and growth of *P. glauca* on biotite- and quartz-rich waste rocks and fine tailings. <http://www.theses.ulaval.ca/2015/312743/312733.pdf>

THE ROLE OF ALGAE IN BIOREMEDIATION OF ORGANIC POLLUTANTS

Ben Chakroun, K., E. Sanchez, and N. Baghouz.

International Research Journal of Public and Environmental Health, Vol 1 No 2, 19-32, 2014

The use of higher plants and bacteria for phytoremediation and bioremediation, respectively, of heavy metals and organic pollutants has been studied for decades; however, application of microalgae for restoration of aquatic environments affected by organic contaminants is fairly recent. This review discusses the potential of microalgae species for bioremediation of organic pollutants in aquatic ecosystems. <http://journalissues.org/wp-content/uploads/2014/07/Chakroun-et-al.pdf>

EFFECTS OF FIELD METAL-CONTAMINATED SOILS SUBMITTED TO PHYTOSTABILISATION AND FLY ASH-AIDED PHYTOSTABILISATION ON THE AVOIDANCE BEHAVIOUR OF THE EARTHWORM *EISENIA FETIDA*

Demuyrick, S., I.R. Succiu, F. Grumiaux, F. Douay, and A. Lepretre.

Ecotoxicology and Environmental Safety, Vol 107, 170-177, 2014

The earthworm (*Eisenia fetida*) avoidance behavior test was used to assess the quality recovery of metal-contaminated soils from land remediated 10 years previously under a former lead smelter in Northern France. Soil metal concentrations ranged from 93 to 1,231 mg metal/kg dry soil for Pb, 56 to 1,424 mg/kg for Zn, 0.3 to 20 mg/kg for Cd, and 15 to 45.5 mg/kg for Cu. Several former plots were treated either by a single phytostabilization process involving installation of a mix of tree species or by fly-ash aided phytostabilization. Silico-aluminous or silico-calcic ashes were plowed to a soil depth of 25-30 cm at a rate of 23.3 kg/m² (i.e., 6 percent W/W). Significant *E. fetida* avoidance was observed for the 10-year ash-treated soils, possibly related to a change of soil texture consisting of an increased level of fine silts and a decreased level of clays. By contrast, afforested metal-contaminated soils appeared more attractive for *E. fetida* than unplanted ones. None of the soils tested, even the most contaminated one, was significantly avoided by worms. This lack of reaction would result from low metals bioavailability in the soils tested.

EFFECTS OF WETTING AGENTS AND APPROACHING ANODE ON LEAD MIGRATION IN ELECTROKINETIC SOIL REMEDIATION

Ng?, Y.-S., M.A. Hashim, and B. Sen Gupta.

5th International Conference on Chemical Engineering and Applications: IPCBEE Vol 74, 44-48, 2014

In the "approaching anode" technique, extra electrodes are installed along the treatment zone, and the anode is switched to these electrodes as appropriate to reduce the migration distance, which results in progressive soil acidification via compression of the high pH region, provides a higher current intensity and acid front for maintaining ion mobility during heavy metal removal, and reduces treatment time (and thus potentially costs). Researchers investigated the effectiveness of fixed anode and approaching anode techniques in electrokinetic soil remediation for Pb migration under different types of wetting agents (0.01M sodium nitrate [NaNO₃] and 0.1M citric acid). Generally, use of citric acid enhanced Pb migration in comparison to NaNO₃. In the NaNO₃ tests, Pb accumulated in the middle of the soil section due to high soil pH, which favored Pb adsorption and precipitation. The approaching anode technique reduced this effect by compressing the high soil pH region and enhanced Pb migration at the cathode region. Approaching anode showed technical advantages only with NaNO₃. Its enhancement with citric acid was insignificant; however, the technique reduced electricity usage by 18-20% for both wetting agents. https://files.ipcbae.com/1773768/CPAA_Ng_Yee_Sem.pdf

RELEASE OF CHROMIUM FROM SOILS WITH PERSULFATE CHEMICAL OXIDATION

Kaur, K. and M. Crimi.

Groundwater, Vol 52 No 5, 748-755, 2014

In evaluating the effectiveness of persulfate in situ chemical oxidation (ISCO) for treating organic contaminants, it is important to identify and understand its potential impact on metal co-contaminants in the subsurface. In an investigation of the impact of persulfate chemical oxidation on the release of Cr from three soils varying in physical-chemical properties, the soils were treated with unactivated and activated persulfate [activated with Fe(II), Fe(III)-EDTA, and alkaline pH] at 41 mM and 2.1 mM persulfate for 48 h and for 6 months. Results show that release of Cr with persulfate chemical oxidation depends on soil type and activation method. Sandy soil with low oxidant demand released more Cr compared to soils with high oxidant demand. More Cr was released with alkaline pH activation. Alkaline pH and high Eh conditions favor oxidation of Cr(III) to Cr(VI), which is the main mechanism of release of Cr with persulfate chemical oxidation. Unactivated and Fe(II)-activated persulfate decreased pH, and at low pH in absence of EDTA Cr release is not a concern. These results indicate that Cr release can be anticipated based on the given site and treatment conditions, and an ISCO system can be designed to minimize potential Cr release. *The study is illustrated in a slide presentation:* http://www.redux-tech.com/doc_download/62-8-5-aur-presentation.html

SYNERGISTIC INTERACTIONS BETWEEN ACTIVATED CARBON FABRICS AND TOXIC HEXAVALENT CHROMIUM

Xu, C., B. Qiu, H. Gu, X. Yang, H. Wei, X. Huang, Y. Wang, D. Rutman, D. Cao, S. Bhana, Z. Guo, and S. Wei. ECS Journal of Solid State Science and Technology, Vol 3 No 3, M1-M9, 2014

Activated carbons can be formed as grains, powders, or fibers. Activated carbon fibers (ACF) can be arranged in packed beds or bound in a variety of systems. Carbon fibers exhibit strong mechanical properties, impressive thermal stability, and good resistance to acids and bases. Powdered adsorbents, they have higher specific surface areas (>1000 m²/g) and faster kinetics of adsorption with easily regenerated use. ACFs also can be folded and mounted on frames to fit in various systems. This paper presents results from an investigation of surface functionalities of ACFs after exposure to Cr(VI) solutions of different pH values for different treatment times. http://engineering.iamar.edu/_files/documents/chemical/156.pdf

General News

TECHNICAL GUIDE FOR ASSESSING AND MITIGATING THE VAPOR INTRUSION PATHWAY FROM SUBSURFACE VAPOR SOURCES TO INDOOR AIR

U.S. EPA, Office of Soil Conservation Response.

OSWER Publication 9200.2-154, 267 pp, 2015

This guide presents EPA's technical recommendations based on current understanding of vapor intrusion into indoor air from subsurface vapor sources. One of its main purposes is to promote national consistency in assessing the vapor intrusion pathway while providing a flexible science-based approach to assessment that accommodates the different circumstances in which vapor intrusion is first considered at a site. The guide is intended for use at any site (and any building or structure on a site) being evaluated by EPA pursuant to CERCLA or the corrective action provisions of RCRA, EPA's brownfield grantees, or state agencies acting pursuant to CERCLA or an authorized RCRA corrective action program where vapor intrusion may be of potential concern. More Cr was released with alkaline pH activation. Alkaline pH and high Eh conditions favor oxidation of Cr(III) to Cr(VI), which is the main mechanism of release of Cr with persulfate chemical oxidation. Unactivated and Fe(II)-activated persulfate decreased pH, and at low pH in absence of EDTA Cr release is not a concern. These results indicate that Cr release can be anticipated based on the given site and treatment conditions, and an ISCO system can be designed to minimize potential Cr release. *The study is illustrated in a slide presentation:* http://www.redux-tech.com/doc_download/62-8-5-aur-presentation.html

TECHNICAL GUIDE FOR ADDRESSING PETROLEUM VAPOR INTRUSION AT LEAKING UNDERGROUND STORAGE TANK SITES

U.S. EPA, Office of Underground Storage Tanks.

EPA 510-R-15-001, 129 pp, 2015

This document provides technical information to EPA, state, tribal, and local agency regulatory personnel for investigating and assessing petroleum vapor intrusion (PVI) at sites where petroleum hydrocarbons have been released from underground storage tanks. The guide comprises two parts. The first part briefly describes EPA's recommended approach for addressing PVI, and the second part provides detailed supporting technical information. <http://www.epa.gov/oswer/vaporintrusion/documents/PVI-Guide-Final.pdf>

GUIDANCE FOR COMMUNICATING VAPOR INTRUSION AT ENVIRONMENTAL RESTORATION SITES

Naval Facilities Engineering Command and Navy and Marine Corps Public Health Center, 46 pp, Oct 2014

This guide is designed to provide Navy Environmental Restoration Program Remedial Project Managers with recommendations for notifying and relaying information regarding vapor intrusion (VI) investigations to Base personnel and potentially affected occupants of industrial, office, or residential buildings at Navy activities. In addition to a communication strategy, the document provides example fact sheets, notification letters, and posters that explain what VI is and how to mitigate it. https://www.navafac.navy.mil/content/dam/navafac/Specality%20Centers/Engineering%20and%20Expeditary%20Wafare%20Center/Environmental/Restoration/or_pdfs/gpr/navafac-nv-guid-vi-comms-20141009f.pdf

TECHNICAL MEMORANDUM: RATIONALE AND EFFICACY OF AMENDING SOILS WITH PHOSPHATE AS MEANS TO MITIGATE SOIL LEAD HAZARD

U.S. EPA, OSWER 9355.4-27, 15 pp, 2015

Of the numerous agents that have been explored for their potential to render soil Pb less bioavailable or less mobile in soil, phosphate agents have been studied most extensively for their effects on oral bioavailability of Pb. This technical memorandum summarizes the major findings and conclusions reported in greater detail in a 2013 review by Scheckel et al., "Amending soils with phosphate as means to mitigate soil lead hazard: A critical review of the state of the science," in the Journal of Toxicology and Environmental Health B (16(6):337-380). <http://dx.doi.org/10.1080/10937463.2015.1048484> <https://www.epa.gov/oswer/vaporintrusion/documents/OSWER-Vapor-Intrusion-Technical-Guide-Final.pdf>

TOOLKIT FOR IDENTIFYING APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS)

Naval Facilities Engineering Command, 31 pp, 2014

ARARs are federal and state environmental or facility siting laws and regulations that are identified when evaluating CERCLA removal or remedial actions. ARARs must be established for CERCLA actions because CERCLA provides exemptions from some aspects of environmental laws and regulations for activities conducted entirely on site. This toolkit consists of eight graphical exhibits that outline key concepts in identifying and documenting ARARs. https://www.navafac.navy.mil/content/dam/navafac/Specality%20Centers/Engineering%20and%20Expeditary%20Wafare%20Center/Environmental/Restoration/or_pdfs/gpr/navafac-nv-tfd-arars-201408f.pdf

ENVIRONMENTAL REMEDIATION AND RESTORATION OF CONTAMINATED NUCLEAR AND NORM SITES

van Velzen, L. (ed.)

Elsevier, New York. ISBN: 978-1-78242-231-0, 276 pp, 2015

This book offers a comprehensive overview of environmental remediation and restoration approaches that aim to reduce exposure to radiation from contaminated soil or groundwater. The text provides a guide to environmental restoration frameworks and processes in the remediation and restoration of contaminated nuclear and naturally occurring radioactive material (NORM) sites, including stakeholder involvement, risk assessment, and cost-benefit. Part 1 provides an introduction to the different types of contaminated sites and their characteristics. Part 2 addresses environmental restoration frameworks and processes. Part 3 reviews different remediation techniques and methods of waste disposal. View the table of contents and chapter abstracts at <http://www.science-direct.com/science/book/9781782422310>

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