Technology Innovation News Survey

Entries for June 1-15, 2013

Market/Commercialization Information

SUPERFUND SAMPLE MANAGEMENT OFFICE (SMO) SUPPORT
U.S. Environmental Protection Agency, Washington, DC.
Federal Business Opportunities, FBO-4235, SOL: SOL-HQ-12-00031, 2013

The Superfund Sample Management Office anticipates the acquisition of contractor services to provide technical, analytical, and quality assurance support, primarily to the EPA Superfund Program (but also to other EPA programs, federal and state agencies, and tribal organizations) to facilitate identification, assessment, regulation, and remediation of environmental hazards that might pose a threat to human health or the environment. The contractor will provide programmatic support and infrastructure for EPA's Analytical Services Branch. Use the search interface at https://www.fedconnect.net/ to locate the details of this acquisition. The anticipated duration of this cost-plus-fixed-fee contract will consist of a 2-year base period, a 2-year option period, and two 2-year award terms, for a total of eight years. This acquisition will be conducted on a full and open basis under NAICS code 541611. Responses are due no later than August 12, 2013, 2:00 PM ET. https://www.fbo.gov/spg/EPA/OAM/HQ/SOL-HQ-12-00031/listing.html

EMERGENCY RESPONSE ENVIRONMENTAL SERVICES, MULTIPLE LOCATIONS
Department of Transportation, Federal Aviation Administration (FAA), Southern Region.
Federal Business Opportunities, FBO-4232, Solicitation DTFAEN-13-R-00063, 2013

The FAA, Eastern Acquisitions Service Area, Southern Region, located in College Park, Georgia, is conducting market research to determine the availability of contractors for emergency remediation services in multiple locations. All past-performance questionnaires must be emailed to the contracting officer no later than July 23, 2013, 2 PM ET, and the main submittal is due July 26, 2013, 2:00 PM ET. The Request for Offers will be issued to the short-list firms on or about August 30, 2013, and posted athttps://faacp.faa.gov, https://www.fbo.gov/spg/DOT/FAA/SR/DTFAEN-13-R-00063/listing.html

EVALUATION OF AN ADVANCED OXIDATION ALTERNATIVE TO THE CURRENT BIOLOGICAL GROUNDWATER CONTAINMENT TREATMENT SYSTEM AND A COST EFFECTIVE IN-SITU SMOLDERING THERMAL TREATMENT SYSTEM TECHNOLOGY TO DESTROY CONTAMINANTS IN PLACE
Department of the Army, U.S. Army Corps of Engineers (USACE), Vicksburg, MS.
Federal Business Opportunities, FBO-4246, Solicitation W81EWF23356521A, 2013

The USACE Engineer Research and Development Center requires labor and expertise to conduct testing and evaluation of in situ alternatives to the current biological groundwater containment treatment system at the Zephyr Refinery site, Muskegon, Michigan. Pilot-scale remediation will be conducted to evaluate whether a mobile advanced-oxidation process system might be suitable for replacing the current system, which was installed to treat oil-range, diesel-range, and gasoline-range organics in the groundwater. The contaminant concentrations pumped from the recovery wells/system range from hundreds to thousands of parts per billion of total BTEX. The work also will include bench-scale testing of a self-sustained smoldering thermal treatment technology using a site soil sample containing free product (gasoline and fuel oil #1) from the Zephyr site. Successful treatment via bench-scale smoldering will lead to a pilot-scale evaluation at the site if funds are available. There is no in situ design approach at this time. Quotes are due July 22, 2013, by 5:00 PM CT. This requirement is 100% set-aside for small business under NAICS Code 541620, size standard not exceeding $7M. https://www.fbo.gov/spg/USACOE/329/W81EWF23356521A/listing.html

REVERSE OSMOSIS MEMBRANE SYSTEM FOR TREATING LANDFILL LEACHATE AT LOWER COST
University of Florida, Office of Technology Licensing, June 2013

University of Florida researchers have developed disposable membranes for an inexpensive landfill leachate treatment system that captures the nutrients in leachate, separates out heavy metals and VOCs, removes water from the landfill cell, and treats the water for reuse. The resulting by-products make suitable fertilizers, and the purified effluent nearly meets state and federal standards for drinking water. Comprising membranes, pipes, pumps, computers, and software, the system treats leachate on site with minimal startup costs, energy consumption, and odor. Licensing information:http://apps.research.ufl.edu/otl/viewTechInfo.cfm?case=13915.

REGION 4 START IV SYNOPSIS
U.S. Environmental Protection Agency, Region 4, Atlanta, GA.
Federal Business Opportunities, FBO-4249, 2013

U.S. EPA Region 4 intends to issue two solicitations for the Superfund Technical Assessment and Response Training (START) requirement under NAICS code 562910, Remediation Services.

- **Solicitation SOL-R4-12-00002** will be competed as a 100% small business set-aside. https://www.fbo.gov/index?s=opportunity&mode=form&id=906b97374f2fb65bef04796c1587c829&tab=core&_cview=0
- **Solicitation SOL-R4-12-00008** will be competed unrestricted. https://www.fbo.gov/index?s=opportunity&mode=form&id=60487bf5441fec68aaa30f9f71a1f96d&tab=core&_cview=0

Requirements include expertise that supports environmental response, preparedness and prevention, assessment and inspection, technical support, data management, and training.

PRAIRIE CREEK REMEDIATION
U.S. Fish and Wildlife Service, Region 3, Bloomington, MN.
Federal Business Opportunities, FBO-4247, Solicitation F13PS00676, 2013

The U.S. Fish and Wildlife Service intends to request environmental consultant services under NAICS code 562910 to develop and construct a work plan approved by the Illinois EPA Project Manager to determine the full extent of soil and groundwater contamination per the IEPA's determination letter and to implement interim remediation measures at Prairie Creek on the north end of Crab Orchard Lake. https://www.fbo.gov/spg/DOI/FWS/CGSWO/F13PS00676/listing.html

Cleanup News

CREOSOTE DNAPL RECOVERY-WELL DESIGN FOR MASS REMOVAL
Coll, F.R. and K.P. Paschl.
Remediation Journal, Vol 23 No 2, 19-30, 2013

An innovative source recovery-well design was developed to achieve separate-phase removal of pooled creosote DNAPL. The design employs modified circulation-well technology to mobilize DNAPL to the engineered recovery well, where it is gravity-settled into a sump to permit separate-phase mass removal of the emplaced DNAPL source without groundwater production or treatment. A discharge mass flux protocol was developed to verify dissolved-phase plume stability and the benefit of the source mass removal. Supplemental information on implementation of the recovery well technology for creosote at an Arkansas wood preserving site is available athttp://www.wmsym.org/archives/2009/pdfs/9125.pdf.

ENHANCING REDUCTIVE DECHLORINATION WITH NUTRIENT ADDITION
Fowler, T. and K. Reinauer.
Remediation Journal, Vol 23 No 1, 25-35, 2013

This paper presents three case studies where the addition of a balanced macro- and micro-nutrient source (e.g., BounTA™) substantially accelerated the biodegradation of chlorinated ethenes (TCE, PCE), independent of the applied electron-donor substrate (i.e., sodium lactate, EHC®, ethyl lactate). [*This paper is Open Access via the "Get PDF" link at* http://onlinelibrary.wiley.com/doi/10.1002/rem.21336/abstract.]

INNOVATIVE INJECTION TECHNIQUE TO TREAT DNAPL IN GRANULAR AND FINE GRAINED MATRICES
Noland, S., R. Boyle, and T.A. Harp.
The Eighth International Conference for Remediation of Chlorinated and Recalcitrant Compounds, Monterey, CA, May 21-24, 2012. Battelle Press, Columbus, OH. 8 pp, 2012

High-energy, low-volume pulses of a water-based suspension of BOS 100®, a granular activated carbon impregnated with metallic iron, were employed to remediate DNAPL at a large urban industrial facility. Initial injections were completed using conventional hydraulic fracturing. Although large portions of the dissolved-phase plume responded to this technique, selected areas were resistant, suggesting input from an unknown source or sources. High-resolution sampling indicated the presence of localized thin seams of DNAPL-impacted soils at several locations in the vicinity of the former TCE underground storage tank. Successful remediation required surgical placement of treatment at fairly high loading. A modified "jetting" approach was developed that allowed extremely accurate placement and injectant/soil mixing over a relatively thick zone. http://www.trapandtreat.com/wp-content/uploads/2013/04/Chlor_Noland-paper.pdf.

LESSONS LEARNED ABOUT THE NATURE OF GROUNDWATER CONTAMINATION BY PAHS: A CASE HISTORY-BASED DISCUSSION
Brassington, R.
Remediation Journal, Vol 23 No 1, 103-121, 2013

This case study concerns the remediation via in situ chemical oxidation (ISCO) of a water supply borehole contaminated with PAHs (fluoranthene, benzo-1,12-perylene, benzo-11,12-fluoranthene, benzo-3,4-fluorathene, and benzo-3,4-pyrene) originating from carbon black used in manufacturing. After investigators evaluated the extent of the contamination and identified the flow path for the pollutants to enter the borehole, they made two attempts to destroy the contaminants using hydrogen peroxide following different procedures. Results are reviewed to determine possible explanations for the observed behavior of PAHs and oxidant and to assess the effectiveness of the treatment methods. [*This paper is Open Access via the "Get PDF" link at*http://onlinelibrary.wiley.com/doi/10.1002/rem.21341/abstract.]

INNOVATIVE MULTI-COMPONENT TECHNOLOGY FOR EFFECTIVE DNAPL CLEANUP AT BUILDING 134, HUNTERS POINT NAVAL SHIPYARD
American Academy of Environmental Engineers & Scientists (AAEES), Excellence in Environmental Engineering and Science Awards, 2013

This project received a 2013 AAES Honor Award for the use of combined remedies for DNAPL contamination at the former Hunter's Point Naval Shipyard (San Francisco). The cleanup strategy for this complex environment combined thermal conductive heating and in situ bioremediation, with emplacement of materials aided by hydraulic fracturing. Within an aggressive 18-month timeframe, the cost-effective and successful cleanup enabled property transfer. http://www.aaees.org/e3competition-winners-2013honor-research.php

PASSIVE AERATION USING A TROMPE
Leavitt, B.R., B.J. Page, C.A. Neely, R.M. Mahony, T.P. Danehy, C.F. Denholm, S.L. Busler, and M.H. Dunn.
2013 National Meeting of the American Society of Mining and Reclamation, June 1-6, 2013, Laramie, Wyoming. R.I. Barnhisel (ed). ASMR, Lexington, KY. Abstract only, p 172, 2013

A trompe is an ancient device with no moving parts that uses falling water to compress air. Water is allowed to fall down a vertical pipe; the velocity of the water in the pipe is high enough that air is entrained and carried down the pipe along with the water. A chamber below the discharge elevation separates the air from the water, the water discharges, and the compressed air then is available for use. A trompe-powered aerator was designed and installed at the Curley passive treatment facility in Fayette County, Pennsylvania. Water conveyed through the trompe generates compressed air that is used to aerate the raw water, raising the dissolved oxygen of the water by nearly 3 mg/L. This aeration increases the oxidized iron by about 10%. Treatment effectiveness was further enhanced with improved system configuration and the installation of additional trompes. *Supplemental information on trompes:* http://www.wvmdtaskforce.com/proceedings/11/Leavitt.doc.

Demonstrations / Feasibility Studies

FIELD EVIDENCE OF DISSOLUTION AND DEGRADATION RATES ENHANCEMENT DURING ISCR AND ENA TREATMENTS OF CHLORINATED SOLVENTS
Barnier, C., C. Palmier, and O. Atteia.
Remediation Journal, Vol 23 No 1, 123-137, 2013

Pilot tests were conducted to compare two methods of chlorinated solvent treatment at an automobile factory where separate PCE sources had created two chlorinated solvent plumes. In situ reduction (EHC®) was applied at the first source and enhanced natural attenuation (sodium propionate, sodium citrate, and sucrose) at the second. Despite an efficient treatment, the PCE and TCE concentrations remained virtually unchanged, whereas degradation rates increased. The authors estimate the dissolution enhancement during the two types of treatment and analyze the influence of each treatment on the increase of degradation kinetics. [*This paper is Open Access via the "Get PDF" link at* http://onlinelibrary.wiley.com/doi/10.1002/rem.21342/abstract.]

DECOMMISSIONING OF AN ANAEROBIC PASSIVE BIOCHEMICAL REACTOR AT THE STANDARD MINE SUPERFUND SITE, CRESTED BUTTE, CO
Gallagher, N., E. Blumenstein, T. Rutkowski, J. DeAngelis, and C. Progess.
2013 National Meeting of the American Society of Mining and Reclamation, June 1-6, 2013, Laramie, Wyoming. R.I. Barnhisel (ed). ASMR, Lexington, KY. Abstract only, p 86, 2013

A pilot anaerobic biochemical reactor (BCR) with a design flow rate of 1 gpm was operated at the Standard Mine Superfund Site from 2007 until fall 2011 to target heavy metals and acidity in mine adit drainage. The pilot system was entirely passive with the exception of a solar-powered feed pump. Decommissioning of the highly successful BCR cell was performed in August 2012 to extract design criteria for a full scale reactor and characterize the spent substrate to determine full-scale disposal requirements. Substrate samples were analyzed for total metals, TCLP, and alkalinity. Pilot substrate was disposed of in a repository on site, although at full scale, off-site substrate disposal might be necessary. As the BCR ages, substrate limestone is depleted, acting as a buffer to influent acidity. As limestone is depleted, the active reaction front migrates where microbiological sulfate reduction occurs. Dissolution rate is often a major limiting factor in BCR operational lifespan and varies substantially according to site water characteristics. Measurement of substrate alkalinity throughout the column allows identification of the rate of limestone dissolution within the substrate and provides design engineers with the information to design a full-scale BCR for effective operation within a probable lifespan. *Longer abstract:* http://www.asmr.us/Meetings/2013/Abstracts%20and%20papers/0086-Gallagher-CO.pdf. *Supplemental information in 28 slides at:*http://www.minewatersolutions.com/wp-content/uploads/2013/05/51-T-Rutkowski-et-al-Passive-treatment-of-mining-wastewater.pdf.

Research

HIGH RESOLUTION PASSIVE SOIL GAS SAMPLING FOR ELEMENTAL HG CHARACTERIZATION
Cole, J., G. Schaefer, and J. Hodny.
NICOLE Technical Meeting, 4 December 2012, Brussels, Belgium. 24 slides, 2012

A wide-scale initial field assessment of elemental Hg can be conducted through the use of a soil vapor sampling technique that is relatively cheap and easy to apply over large areas. A case study illustrates how application of a passive soil vapor survey allowed investigators to access difficult areas for an initial screening and refine the number of soil boreholes potentially needed from >300 boreholes to 20. The soil-gas sampling results can be used to refine and select high-impact or potential source areas for the more expensive soil (borehole) sampling and analysis.

http://www.ch2m.com/corporate/services/environmental_management_and_planning/assets/2013/CH2M-HILL-High-Resolution-Passive-Soil-Gas-Sampling-Elemental-Mercury-Characterization.pdf

USE OF ACTIVATED CARBON TO CONTROL VOLATILIZATION OF ORGANIC CONTAMINANTS FROM THE INDIANA HARBOR CONFINED DISPOSAL FACILITY
Myers, T.E., C.B. Price, D.E. Averett, and P.R. Schroeder.
ERDC/EL TR-12-29, 145 pp, 2012

This study investigated the processes relevant to controlling volatile emissions from contaminated sediment via carbon adsorption, including the forms of activated carbon (AC) to use, application rates, and application methods appropriate for a controlled disposal facility. Based on settling tests, a regenerated carbon available at about one-half the cost of virgin AC was selected for the study. The adsorption isotherm data showed that carbon adsorption was very effective for the removal of 3- and higher-ring PAHs from water. Carbon treatment of dredged material slurry and exposed dredged material solids appeared to have little effect on higher molecular weight PAHs and VOCs, however, although carbon reduced the volatilization of lower molecular weight PAHs.http://www.dtic.mil/cgi-bin/GetTRDoc?Location=U2&doc=GetTRDoc.pdf&AD=ADA569532

NANOSCALE ZEROVALENT IRON ALTERS SOIL BACTERIAL COMMUNITY STRUCTURE AND INHIBITS CHLOROAROMATIC BIODEGRADATION POTENTIAL IN AROCLOR 1242-CONTAMINATED SOIL
Tilston, E.L., C.D. Collins, G.R. Mitchell, J. Princivalle, and L.J. Shaw.
Environmental Pollution, Vol 173, 38-46, Feb 2013

In a two-step PCB remediation scenario comprising nanoscale zero-valent iron (NZVI) dechlorination followed by aerobic biodegradation, researchers examined the effect of polyacrylic acid-coated NZVI (mean diameter = 12.5 nm) applied at 10 g/kg NZVI to Aroclor-1242-contaminated and uncontaminated soil over 28 days. NZVI had a limited effect on Aroclor congener profiles; however, either directly or indirectly via changes to soil physico-chemical conditions (pH, Eh), NZVI addition caused perturbation to soil bacterial community composition and reduced the activity of chloroaromatic-mineralizing microorganisms. Results indicate NZVI addition has the potential to inhibit microbial functions that could be important for PCB remediation strategies combining NZVI treatment and biodegradation. *Supplemental information in 36 slides:* http://www.oecd.org/env/ehs/nanosafety/44022857.pdf.

NATURAL PRETREATMENT AND PASSIVE REMEDIATION OF HIGHLY POLLUTED ACID MINE DRAINAGE
Macias, F., M.A. Caraballo, J.M. Nieto, T.S. Roetting, and C. Ayora.
Journal of Environmental Management, Vol 104, 93-100, 2012

Although pilot experiments on acid mine drainage (AMD) from the Iberian Pyrite Belt, based on limestone sand dispersed in wood shavings (referred to as dispersed alkaline substrate, or DAS) were shown to be an efficient treatment option, the method did not achieve complete metals removal, principally due to high ferrous iron concentration in the inflow AMD. To oxidize and remove iron, a natural Fe-oxidizing lagoon (NFOL) was added prior to the limestone-DAS treatment. The NFOL comprises several pre-existing Fe-stromatolite terraces and cascades, and a 100 m ^{3} lagoon built near the mine shaft. The downstream limestone-DAS treatment consists of two 3 m ^{3} reactive tanks, each filled with limestone-DAS reactive substrate, connected in series with two 6 m ^{3} (each) decantation ponds and several oxidation cascades. The AMD emerging from the mine shaft showed a pH near 3 and a net acidity of 1,800 mg/L as calcium carbonate equivalents. The enhanced system removed a mean of 1,350 mg/L net acidity as calcium carbonate equivalents (71% of inflow), corresponding to 100% of Fe, Al, Cu, Pb, and As, and 6% of Zn.

EFFECT OF LOW TEMPERATURE THERMAL TREATMENT ON SOILS CONTAMINATED WITH PENTACHLOROPHENOL AND ENVIRONMENTALLY PERSISTENT FREE RADICALS
dela Cruz, A.L., R.L. Cook, S.M. Lominicki, and B. Dellinger.
Environmental Science & Technology, Vol 46 No 11, 5971-5978, 2012

The chemical behavior of pentachlorophenol (PCP) molecules and the environmentally persistent free radicals (EPFRs) in soil from a former Superfund wood-treating site was monitored at temperatures ranging from 25-300°C via electron paramagnetic resonance spectroscopy and GC-MS analysis, respectively. Two types of thermal treatment were employed: closed heating (oxygen-starved condition) where the soil was heated under vacuum, and open heating (oxygen-rich conditions), where the soil was heated in ambient air. Results suggest that low-temperature treatment of soils contaminated with PCP can convert the PCP to potentially more toxic pentachlorophenoxyl EPFRs, which can persist in the environment long enough for human exposure to occur.

ARSENIC REMOVAL VIA ZVI IN A HYBRID SPOUTED VESSEL/FIXED BED FILTER SYSTEM
Calo, J.M., L. Madhavan, J. Kirchner, and E.J. Bain.
Chemical Engineering Journal, Vols 189-190, 237-243, 2012

A novel, hybrid, spouted-vessel/fixed-bed filter system for the removal of arsenic from water utilizes zero-valent iron (ZVI) particles circulating in a spouted vessel that continuously generates active colloidal iron corrosion products via the self-polishing action between ZVI source particles rolling in the moving bed (J.M. Calo, U.S. Provisional Patent, Feb 17, 2012). This action also serves as a surface renewal mechanism for the particles, providing for maximum utilization of the ZVI material. The colloidal material produced is captured continuously and concentrated in a fixed-bed filter located within the spouted vessel reservoir wherein arsenic complexation occurs. This system performed very effectively for arsenic removal in the µg/L arsenic concentration (i.e., drinking water treatment) range, reducing 100 µg/L of arsenic to below detectable levels in less than an hour. A mechanistic analysis of arsenic behavior in the system identifies the principal components of the population of active colloidal material for arsenic removal and explains the working principles of the system.

A REVIEW OF VAPOR INTRUSION MODELS
Yao, Y., R. Shen, K.G. Pennell, and E.M. Suuberg.
Environmental Science & Technology, Vol 47 No 6, 2457-2470, 2013

A complete vapor intrusion (VI) model, describing vapor entry of VOCs into buildings located on contaminated sites, generally consists of two main parts: one part describing vapor transport in the soil and the other describing its entry into the building. Modeling the soil vapor transport part involves either analytically or numerically solving the equations of vapor advection and diffusion in the subsurface. This review summarizes existing VI models and discusses the limits of current screening tools commonly used in this field.

VAPOR INTRUSION MODELS FOR PETROLEUM AND CHLORINATED VOLATILE ORGANIC COMPOUNDS: OPPORTUNITIES FOR FUTURE IMPROVEMENTS
Bekele, D.N., R. Naidu, M. Bowman, and S. Chadalavada.
Vadose Zone Journal, Vol 12 No 2, 2013

Existing vapor intrusion (VI) risk assessment models generally do not account for the fate of vapor as it migrates upward from a source zone. This paper presents an overview of vapor interactions in the vadose zone and the implications for existing models for VI risk assessment.

THE PHYTOREMEDIATION ABILITY OF A POLYCULTURE CONSTRUCTED WETLAND TO TREAT BORON FROM MINE EFFLUENT
Turker, O.C., H. Bocuk, and A. Yakar.
Journal of Hazardous Materials, Vols 252-253, 132-141, 2013

A small-scale, subsurface-flow, polyculture-constructed wetland (PCW) was installed to treat boron mine effluent from the world's largest borax mine (Kirka, Turkey) under field conditions. The experimental wetland was vegetated with common reed (*Phragmites australis*) and cattails (*Typha latifolia*), and the mine effluent was directed through it. Results show that boron concentrations of the mine effluent decreased on average from 187 to 123 mg/L (32% removal rate). *T. latifolia* absorbed a total of 250 mg/kg boron and *P. australis* absorbed a total of 38 mg/kg boron during the study period.

EFFECTS OF PLANT SPECIES ON SOIL MICROBIAL PROCESSES AND CH_4 EMISSION FROM CONSTRUCTED WETLANDS
Wang, Y., H. Yang, C. Ye, X. Chen, B. Xie, C. Huang, J. Zhang, and M. Xu.
Environmental Pollution, Vol 174, 273-278, 2013

Methane (CH_4) emission from constructed wetlands has raised environmental concern. Methane emission data from a study to evaluate the influence of mono- and polyculture constructed wetland and seasonal variation on methane fluxes showed large temporal variation ranging from 0 to 249.29 mg methane/m^2/h. The highest methane flux was obtained in the polyculture system, planted with *Phragmites australis*, *Zizania latifolia*, and *Typha latifolia*. FISH analysis showed the higher amount of methanotrophs in the profile of *Z. latifolia* in both mono- and polyculture systems. Where methane fluxes are a concern, the polyculture constructed wetland has the higher greenhouse gas potential.

FIELD AND PILOT-SCALE GEOCHEMICAL INVESTIGATIONS INTO USING SEWAGE SLUDGE FOR SULPHIDIC MINE WASTE REMEDIATION
Nason, P.A., Licentiate thesis, Lulea University of Technology, Sweden. 90 pp, 2012

Results were obtained from three different sewage sludge (SS) applications at pilot and field scale in northern Sweden at timeframes ranging from 3 to 8 years. (1) An 8-year pilot-scale investigation focused upon using SS as a sealing-layer barrier material in a composite dry cover showed that the layer significantly reduced oxygen diffusion to underlying tailings, behaving as a physical obstruction and as a reactive organic barrier. (2) A 3-year, field-scale surface application of 12,000 tonnes of SS onto a pre-remediated tailings impoundment at the Kristineberg mine produced a 2-year pulse of sludge-borne nitrate that entered the groundwater before vegetation was established, releasing a plume containing elevated concentrations of dissolved Cu, Ni, Pb, and Zn. The metals plume is expected to subside after ~6 years. (3) A 3-year field-scale investigation of the SS plots at the Gillervattnet tailings impoundment at the Boliden mine demonstrated inhibition of sulfide oxidation, successful vegetation establishment within 1 year, and a tailings pH 2 to 5 orders higher than the uncovered tailings, which inhibited metals transport.
http://pure.ltu.se/portal/en/publications/field-and-pilotscale-geochemical-investigations-into-using-sewage-sludge-for-sulphidic-mine-waste-remediation%28963535dc-a777-4134-8dbd-57c59926cf62%29.html

TREATMENT OF ACIDIC AND NEUTRAL METAL-LADEN MINE WATERS WITH BONE MEAL FILTERS
Sartz, L. and M. Baeckstroem.
International Mine Water Association Symposium, 29 September - 4 October 2012, Bunbury, Australia. 643-650, 2012

This study reports on mine water treatment with apatite containing bone meal filters. In a test of two different mine waters, one acidic and one neutral, bone meal in the acidic system efficiently retained trace elements, especially lead. In the neutral system, pH was too high for apatite dissolution, and the decrease in metal concentrations thus was due only to physical filtering. http://www.imwa.info/docs/imwa_2012/IMWA2012_Sartz_643.pdf

General News

CONTROL OF BIOFOULING: LESSONS LEARNED FROM A DECADE OF CARBON INJECTION SYSTEM OPERATION AND MAINTENANCE
Burnell, S., J. Spitzinger, P. Jin, J. Erickson, E. Hauber, and D. Nelson.
Remediation Journal, Vol 23 No 1, 85-101, 2013

Biofouling can impair performance in any size system, but effects are often magnified by large substrate injection volumes and extended timeframes. Design should be considered in all stages of the anaerobic enhanced in situ bioremediation life cycle, particularly as related to reagent mixing, storage, and residence time within the system. By understanding the fundamental mechanisms of biofouling, practitioners can make operational adjustments to enhance remedy performance. A combination of chemical and physical methods may be required for effective long-term operation of a carbon handling system; however, the operational costs can be greatly reduced and delivery efficiency increased if these methods are understood during the design phase. [*This paper is Open Access via the "Get PDF" link at* http://onlinelibrary.wiley.com/doi/10.1002/rem.21340/abstract]

REVIEW OF MINE DRAINAGE TREATMENT AND SLUDGE MANAGEMENT OPERATIONS
Zinck, J. and W. Griffith.
CANMET Mining and Mineral Sciences Laboratories (MMSL), CANMET-MMSL 10-058(CR), MEND Report 3.43.1, 101 pp, Mar 2013

At the request of the Mine Environment Neutral Drainage Program, Natural Resources Canada conducted a survey of mine drainage treatment and sludge management practices. Data were collected on over 100 sites, most located in Canada but also in the USA, UK, Australia, Mexico, Peru, China, South Africa, Germany, Brazil, New Zealand, and Hungary. Base metal mines were in the majority (46%), followed by precious metal (23%), coal (7%), uranium (5%), and other (19%). The majority of sites surveyed reported that they expect to treat in perpetuity; hence, treatment choice is critical for both economic and environmental reasons. Roughly 30% of the sites control their influent flow through water management practices. Active treatment processes were the most prevalent, with chemical treatment (lime, flocculant) more common than physical (membrane) and biological processes combined. Capital costs ranged considerably from $0.02 million to $42 million, with an average of ~$7.5 million. The average cost to treat one cubic meter of mine drainage was $1.54. A majority of sites utilized sludge ponds for dewatering and permanent sludge disposal.
http://www.mend-nedem.org/reports/files/3.43.1.pdf

INTERIM INVENTORY AND ASSESSMENT OF ABANDONED MINERAL LANDS IN THE NATIONAL PARK SYSTEM
Burghardt, J.E., E.S. Norby, and H.S. Pranger II.
Natural Resource Technical Report NPS/NRSS/GRD/NRTR-2013/659, 44 pp, 2013

This report presents the interim results of a system-wide National Park Service inventory and assessment of its abandoned mineral lands (AML) conducted from FY 2010 through FY 2012. Of the 23,182 features inventoried, 1,341 (5.8%) have received long-term treatment; 2,869 (12.4%) are in need of treatment; and the remaining 18,972 (81.8%) have been inventoried to characterize each site but do not need treatment. The total estimated cost to remediate the 2,869 AML features is $55.6 million. http://www.nature.nps.gov/geology/aml/inventory/NPS_AML-IandA_508_Compliant-2013-0308-FINAL.pdf

NEW INSTITUTIONAL CONTROLS (IC) DATA FLOW NOW AVAILABLE
Environmental Information Exchange Network News Release, 10 June 2013

The Network Technology Board has unveiled the new Institutional Controls (IC) Data Exchange. Institutional controls are non-engineered instruments, such as administrative and legal controls, that help minimize the potential for human exposure to contamination and protect the integrity of a remedial action. ICs can reduce exposure to contamination by limiting land or resource use and guide human behavior at a site. In 2013, a project team developed the implementation resources necessary to allow IC data to be published via the Exchange Network using a standardized data format. This standardized approach will help bring IC information into land-use decision-making, potentially supporting cleanup remedies by improving IC compliance. The IC Data Exchange provides both Query and Solicit services. No data processing services are required. The Exchange Network is jointly governed by representatives from EPA, states, territories, and tribes. See more at http://www.exchangenetwork.net/data-exchange/ic/.

RESOURCES FOR ENVIRONMENTAL CHEMISTRY EDUCATION
Dunnivant, F., et al., Whitman College, 2013

Professor Frank Dunnivant and Whitman College students have developed a series of free analytical and environmental chemistry resources, including textbooks and software. Nine free educational software packages and videos on environmental topics and analytical instrumentation and two free eTextbooks on trace inorganic and organic analyses using instrumentation are available. Downloads can be found as follows:

- Software packages (e.g., the Dispersion Calculator): http://people.whitman.edu/~dunnivfm/software.html
- *Flame Atomic Absorbance and Emission Spectroscopy and Inductively Coupled Spectrometry-Mass Spectrometry*, F.M. Dunnivant and J.W. Ginsbach, 2009: http://people.whitman.edu/~dunnivfm/FAASICPMS_Ebook/Prelim/index.html
- *Gas Chromatography, Liquid Chromatography, Capillary Electrophoresis-Mass Spectrometry*, F.M. Dunnivant and J.W. Ginsbach, 2011: http://people.whitman.edu/~dunnivfm/C_MS_Ebook/Prelim/index.html

CONFERENCE: ADVANCES IN THERMAL REMEDIATION
University of Texas website, 2013

A conference on Advances in Thermal Remediation was held in Austin, Texas, on January 8-9, 2013. Nine of the conference's slide presentations are available on line at http://iap.cpge.utexas.edu/therm2013/, including "Thermal Treatment of Chlorinated Solvents Offers Opportunities for Combined Remedies" and "Mercury and ISTD: Research Overview and Perspectives."

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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