

# Technology Innovation News Survey

## Entries for March 16-31, 2015

### Market/Commercialization Information

#### REMEDIAL ACQUISITION FRAMEWORK (RAF) UPDATED OVERVIEW

U.S. Environmental Protection Agency, Washington, DC.  
Federal Business Opportunities, FBO-4905, Solicitation SOL-HQ-14-00023, 2015

EPA has developed a webinar — "Remedial Acquisition Framework (RAF) Updated Overview" — to present the anticipated timeline and proposed contract structure of the RAF suite of EPA contracts. The webinar will be held on Wednesday, May 13, 2015, from 1:00 - 3:00 PM ET. Register to attend at <http://www.clu-in.org/conf/raf/>.  
<https://www.fbo.gov/spg/EPA/OAM/HQ/SOL-HQ-14-00023/listing.html>  
Additional information on EPA's RAF is posted on FedConnect at <https://www.fedconnect.net/FedConnect/?doc=SOL-HQ-14-00023&agency=EPA>.

#### SOURCES SOUGHT FOR PARCEL 3 CLOSURE AND CORRECTIVE ACTION PROJECT, FORT WINGATE DEPOT ACTIVITY, NEW MEXICO

U.S. Army Corps of Engineers, USACE District, Tulsa, OK.  
Federal Business Opportunities, FBO-4906, Solicitation W912BV-15-S-1000, 2015

The Government is conducting market research to ensure there is adequate competition among the potential pool of responsible contractors to award a performance-based remediation contract for closure and corrective action (in accordance with RCRA) of Parcel 3 at the Fort Wingate Depot Activity, which is heavily contaminated with a wide array of munitions and explosives. All types of small businesses are encouraged to submit statements of interest. The proposed project will be a competitive, firm-fixed-price, C-type service contract with a period of performance of up to eight years and a total estimated value of \$90M-\$110M. The NAICS code for this procurement is 562910, small business size of 500 employees. The anticipated solicitation issue date is on or about August 25, 2015, with proposals likely due November 3, 2015. Contractors responding to this notice must complete the on-line survey questionnaire posted at <https://www.surveymonkey.com/s/GBDB6Y9r> before 5:00 PM CT, May 13, 2015. <https://www.fbo.gov/spg/USA/COF/DACA56/W912BV-15-S-1000/listing.html>

#### DECOMMISSIONING, REMEDIATION AND RELATED SERVICES

Department of Transportation, Volpe National Transportation Systems Center, Cambridge, MA.  
Federal Business Opportunities, FBO-4907, Solicitation DTRT5715SS00004, 2015

The Volpe Center is conducting market research to evaluate the availability and interest of potential offerors that are capable of supporting the cleanup and closure of contaminated sites and the proper disposition of obsolete and abandoned infrastructure. The Volpe Center currently provides environmental remediation and decommissioning services for a variety of federal agencies and departments at worksites across the nation, but mainly for the Federal Aviation Administration. The primary program drivers are CERCLA and RCRA. Brief statements of qualifications in response to this notice are due by or before 5:00 PM ET, May 21, 2015. <https://www.fbo.gov/notices/9e4b92c23895290b1c1e3299678d93c5>

#### SMALL BUSINESS PRE-PLACED REMEDIAL ACTION, ID/IQ, MULTIPLE AWARD TASK ORDER CONTRACT (MATOC)

U.S. Army Corps of Engineers (USACE), USACE District, Kansas City, MO.  
Federal Business Opportunities, FBO-4886, Solicitation W912DQ-15-R-3003, 2015

This procurement will support work assigned to the USACE Northwestern Division and EPA Region 2 for hazardous, toxic, and radioactive waste remediation projects for both civilian and military agencies of the federal government. Environmental response actions will include remediation services and construction activities mandated by the Defense Environmental Restoration Program, Superfund, DoD Environmental Quality Program, Brownfields, Formerly Utilized Sites Remedial Action Program, and Base Realignment and Closure Program. The solicitation will be issued on or about May 18, 2015, as a small business IDIQ MATOC under NAICS code 562910. Firm-fixed-price and cost-reimbursement task orders will be written against up to 10 IDIQ contracts with a maximum shared capacity of \$176.25M. Contracts will have a three-year base period with a two-year option. <https://www.fbo.gov/spg/USA/COF/DACA41/W912DQ-15-R-3003/listing.html>

#### REGIONAL ENVIRONMENTAL ACQUISITION TOOL, ENVIRONMENTAL REMEDIATION SERVICES, U.S. ARMY CORPS OF ENGINEERS, SOUTH ATLANTIC DIVISION (SAD)

Department of the Army, U.S. Army Corps of Engineers, USACE District, Jacksonville, FL.  
Federal Business Opportunities, FBO-4900, Solicitation W912EP15R0011, 2015

The U.S. Army Corps of Engineers, Jacksonville District, intends to advertise on a small business set-aside basis for the award of an IDIQ, multiple-award task-order contract with a total capacity of \$188 million for up to five small businesses. The geographic areas to be served by these remediation services contracts will be all states within SAD (Alabama, Tennessee, Florida, Georgia, Mississippi, North Carolina, and South Carolina), Puerto Rico, U.S. Virgin Islands, Guam, and Central America. The applicable NAICS code is 562910; small business size standard is 500 employees. Awarded contracts will consist of a 3-year base period and one 2-year option. Release of this solicitation is anticipated on or about May 8, 2015. <https://www.fbo.gov/spg/USA/COF/DACA17/W912EP15R0011/listing.html>

#### DOE OFFICE OF ENVIRONMENTAL MANAGEMENT (EM) UPCOMING BUSINESS OPPORTUNITY FORUM

Department of Energy, Office of Environmental Management, Washington, DC.  
Federal Business Opportunities, FBO-4890, Solicitation EM\_BUSINESS\_FORUM-6-10-2015

The next Office of Environmental Management Business Opportunity Forum has been scheduled for June 10, 2015, from 1-3 PM to discuss the status of ongoing and upcoming EM procurement opportunities. The event will be held in the large auditorium, ground floor in the Forrestal Building at 1000 Independence Ave., SW, Washington, DC 20585. There is no charge to attend, but preregistration by June 5 (via email) is a must. To provide companies an opportunity to voice their individual views with DOE, 15-minute face-to-face appointments will be available on June 11 with Mr. Jack Surash, Deputy Assistant Secretary for EM Acquisition and Project Management. Once the June 11 appointments are filled, time will be made available on other days. Those interested in a face-to-face meeting should so indicate during preregistration [https://www.fbo.gov/spg/DOE/PAM/HQ/EM\\_BUSINESS\\_FORUM-6-10-2015/listing.html](https://www.fbo.gov/spg/DOE/PAM/HQ/EM_BUSINESS_FORUM-6-10-2015/listing.html)

#### IMPACTED SOIL MITIGATION AT DEVILS POSTPILE NATIONAL MONUMENT

Department of the Interior, National Park Service, Fort Mason, San Francisco, CA.  
Federal Business Opportunities, FBO-4893, Solicitation P15PS00694, 2015

The Department of Interior, National Park Service (NPS), Devils Postpile National Monument (DEPO) has identified a requirement to solicit for the mitigation of impacted soil under CERCLA. This project is a removal action for DEPO soil affected by lead-based paint, with restoration of the site to a natural condition. The acquisition is set aside for service-disabled, veteran-owned small business concerns, NAICS code 562910. NPS intends to issue an RFP on or about May 5, 2015, with a projected closing date of June 5, 2015. The anticipated period of performance is from July 8, 2015, to June 25, 2016. A DEPO preconstruction site visit is scheduled for 11:00 AM PT, Tuesday, May 19, 2015. <https://www.fbo.gov/spg/DOI/NPS/APC-15/P15PS00694/listing.html>

#### RADIOLOGICAL CHARACTERIZATION STUDY-ENVIRONMENTAL SERVICES

Department of Commerce, National Institute of Standards and Technology, Gaithersburg, MD.  
Federal Business Opportunities, FBO-4901, Solicitation NB195000-15-02122, 2015

Contractor services are required to perform a radiological characterization study of soil and groundwater adjacent to structural foundations. Research activities have occurred inside the building that could leave radioactive activation products in the walls. The period of performance will be 180 calendar days from issuance of notice to proceed. This procurement is a total small business set-aside. Offers are due by 1:00 PM ET, May 14, 2015. <https://www.fbo.gov/spg/DOC/NIST/A&ASD/NB195000-15-02122/listing.html>

#### REMEDICATION OF CHEMICAL AGENT-CONTAMINATED SOILS AND DEBRIS

Army Contracting Command - Rock Island, Chemical Demilitarization Div., Rock Island, IL.  
Federal Business Opportunities, FBO-4898, Solicitation W52P1J15R0077, 2015

On February 3, 2015, the Joint Project Manager for Elimination issued a Special Notice under this solicitation number to conduct market research on technologies for on-site remediation of chemical agent-contaminated soils and debris at large chemical weapons burial sites. Based on evaluation of submitted vendor capabilities and other market research, the Government plans to select a thermal desorption technology for testing. Issuance of an RFP within a May-June 2015 timeframe will be announced by a presolicitation synopsis in FedBizOpps. <https://www.fbo.gov/notices/80020046a3adc76266cfd2444f824e57>

### Cleanup News

#### WASTE DISCHARGE REQUIREMENTS FOR PACIFIC GAS AND ELECTRIC COMPANY GROUNDWATER REMEDIATION PROJECT AGRICULTURAL TREATMENT UNITS

California Regional Water Quality Control Board, Lahontan Region. Board Order No. R6V-2014-0023, 35 pp, 2014

Phytoremediation systems termed "agriculture treatment units" are in place to treat lower-concentration Cr(VI)-contaminated groundwater and provide for hydraulic control of the plume. Controlled application occurs at over 100 acres of pivot systems where each treatment zone uses a center-pivot drag-drip irrigation system that operates at ~1,400 gal/min, applying it to fields used to grow crops, typically forage crops for livestock such as alfalfa or sudan grass. The toxic, soluble Cr(VI) in the extracted groundwater applied to the fields is chemically reduced in the soils and root zones to the less toxic and insoluble Cr(III), where it remains immobilized. Based on analysis of almost 19 years of monitoring data from the site's agricultural treatment areas, phytoremediation removes, through reduction, ~95% of the Cr(VI) contained in the extracted groundwater. Extracting the groundwater to irrigate crops also provides hydraulic containment to limit the migration of the chromium plume in groundwater. See additional information at PG&E's Hinkley Groundwater Remediation Program website: <http://www.hinkleygroundwater.com/index.php/site-information/agricultural-remediation-units/>

#### SURFACTANT FLUSHING AND ENHANCED REMEDIATION AT A REMOTE SITE IN NORTHERN BC

Wells, R., G. Frank, and R. Birk. 2014 RPIC Federal Contaminated Sites National Workshop, 14-16 April, Ottawa, Ontario, 33 slides, 2014

The remediation strategy at a remote site in Northern British Columbia combines surfactant flushing and enhanced bioremediation. The remedial approach utilizes a modified pump-and-treat system with a subsurface reinjection bed and air injection. The surfactant serves to mobilize the hydrocarbons, while the recirculation system coupled with countercurrent air injection oxygenates the water as it percolates back down to the contaminated zone. Trends in contaminant loading and bioremediation markers are presented along with lessons learned, system modifications made to support the remedial approach, and techniques developed. [http://www.rpic-birc.ca/documents/RPIC\\_ECS2014/Presentations/10-Wells\\_2014\\_RPIC\\_Presentation\\_PWGSC\\_Liard\\_River\\_Remediation-V3.pdf](http://www.rpic-birc.ca/documents/RPIC_ECS2014/Presentations/10-Wells_2014_RPIC_Presentation_PWGSC_Liard_River_Remediation-V3.pdf)

#### OPTIMIZED REMEDIAL STRATEGY AND PERFORMANCE METRICS TO MANAGE AN EXTENSIVE MTBE PLUME AT THE DODHF, NOVATO, CA

Clark, D. and T. Meyers. Environmental Restoration News, No 8, 5-8, Jun 2014

Two former Navy gas stations were operated from the mid-1970s through the early 1990s at DoD Housing Facility (DoDHF) Novato, 20 miles north of San Francisco. Excavation of the underground storage tanks and associated conveyance piping was completed in 1992. Releases from the two stations had produced a commingled plume of gasoline-related constituents. MTBE concentrations in groundwater were as high as 200,000 µg/L, compared to a cleanup goal of 13 µg/L. The MTBE plume also had migrated ~0.5 mile downgradient, extending substantially

beyond the former Navy property boundary. The on-site source target treatment areas (TTAs No. 1 and No. 2) were addressed with air sparging and biosparging technologies, respectively. The Navy also selected air sparging as the preferred treatment for the off-site TTA No. 3 hot spot. The remedial strategy and performance metrics resulted in a successful end to active remediation within the former plume hot spots and a transition to monitored natural attenuation (MNA). Modeling of MNA performance indicates that groundwater cleanup goals likely will be achieved in all remaining monitoring wells within 15 years. <http://www.solutions-ies.com/download/2011-3%20ER%20News%20Issue%208%20Final.pdf>

#### MIP/LIF TECHNOLOGY: TO USE OR NOT TO USE?

Groves, C., I. Mendes, J. Shearn, and B. Pellerin. 2014 RPIC Federal Contaminated Sites National Workshop, 14-16 April, Ottawa, Ontario, 30 slides, 2014

As part of the work program for completing a gap analysis and detailed testing program of three sites located at Canadian Forces Base in Angus, Ontario, membrane interface probe (MIP) and laser-induced fluorescence (LIF) technology were used in conjunction with traditional soil borings and monitoring well installations to assess subsurface conditions at each site and to delineate the extent of contamination by BTEX, petroleum hydrocarbon fractions F1-F4, and PAHs. The three sites consisted of a former vehicle refueling facility, a former wheeled vehicle hangar area, and a former bulk fuel storage area. A total of 146 MIP locations and 26 LIF locations were advanced along several transects at each site. During probe advancement, an experienced technician reviewed the data and provided a preliminary interpretation of the results at each probe location, thus allowing workers to make in-field adjustments to the work program. The MIP/LIF results were used to optimize borehole and monitoring well placement and also were combined with information gathered during drilling operations to develop a 3-D conceptual site model. The MIP and LIF data proved to be a beneficial screening tool for assessing the presence and distribution of contaminants and possible preferential pathways for contaminant migration and impacts to off-site receptors at two of the sites; for the third site, results were mixed. This presentation discusses lessons learned in applying MIP and LIF at the three study sites. [http://www.rpic-ibrc.ca/documents/RPIC\\_FCS2014/Presentations/4-Mendes\\_FINAL\\_PRES\\_RPIC\\_2014\\_MIP\\_Use\\_or\\_Not.pdf](http://www.rpic-ibrc.ca/documents/RPIC_FCS2014/Presentations/4-Mendes_FINAL_PRES_RPIC_2014_MIP_Use_or_Not.pdf)

#### REMEDIAL STRATEGIES FOR A STRUCTURALLY COMPLEX INDUSTRIAL FACILITY

Santella, N., T. Fischer, and G. Webb. Geological Society of America Abstracts with Programs, Vol 46 No 2, p116, 2014

An air sparging and soil vapor extraction remediation system was pilot tested, designed for full-scale implementation, and installed at a former industrial facility. When the unconfined/semi-confined groundwater rose several feet due to decommissioned stormwater management systems and periods of historic rainfall, the system was retrofitted with a groundwater depression system. The area of concern is a multi-tiered parking lot and building foundation, which creates various hydraulic gradients and influences contaminant migration. The challenge is to remove as much chemical mass from the subsurface in the most cost-effective manner. Through detailed evaluation of remediation data and various tests performed on the subsurface, the contractor has optimized the system to recover nearly 20 lb of contaminant mass from the subsurface per day.

### Demonstrations / Feasibility Studies

#### IN-SITU SOLIDIFICATION OF CONTAMINATED SEDIMENTS: A TECHNOLOGY DEMONSTRATION PROJECT

Electric Power Research Institute (EPRI), Palo Alto, CA. Project 3002005216, 1086 pp, 2014

As an alternative to dredging and capping sediments affected by historical MGP operations, research was performed to determine if full-scale in situ solidification (ISS) and support equipment contained on a barge could solidify tar-contaminated sediments through a column of water using readily available grout components while meeting U.S. EPA performance goals. Project elements included the control of turbidity, pH, and shear using a dual-turbidity curtain system, and results showed that rigid controls such as steel sheet piling may not be required for good performance. The report covers site characterization and treatability study of the pilot study area; permitting and mobilization; ISS operations in December 2013; sampling and testing; monitoring; pilot costs; and estimated full-scale costs. The primary result of the project was proof of concept that ISS of submerged sediments is achievable and is ready to be tested at a larger scale. <http://www.epri.com/abstracts/Pages/ProductAbstract.aspx?ProductID=000000003002005216>

#### PILOT-SCALE FIELD TEST OF SOLUBILITY ENHANCED IN SITU CHEMICAL OXIDATION OF VOLATILE ORGANIC CONTAMINANTS

Eberle, D.E.H. and T.B. Boving. Geological Society of America Abstracts with Programs, Vol 46 No 2, p116, 2014

Contaminants with higher aqueous solubilities generally are more accessible for in situ chemical oxidation (ISCO) relative to less soluble compounds. The potential of using a solubility enhancing agent was investigated to overcome this limitation and increase ISCO remediation efficiency by combining a peroxone (O<sub>3</sub> + H<sub>2</sub>O<sub>2</sub>)-activated sodium persulfate system (OxyZone®) and the solubility enhancing agent hydroxypropyl-beta-cyclodextrin (HPCD). Through the formation of inclusion complexes, HPCD can increase the apparent solubility of nonpolar contaminants, including VOCs, and greatly promote contaminant desorption from the soil matrix. A full-scale field test comprising two major injection events was conducted April-August 2013 at a former fire-training area affected by 1,1,1-TCA, PCE, and dichlorobenzenes. To the authors' knowledge, this is the first pilot-scale field test of HPCD-enhanced ISCO.

#### PILOT-SCALE EVALUATION OF AN IN SITU AMENDMENT DELIVERY AND MIXING DEVICE FOR CONTAMINATED SEDIMENT REMEDIATION APPLICATIONS

Hadnagy, E., K.H. Gardner, W.H. Chesner, H. Justus, M. Forgiione, and G. Maxwell. Journal of Soils and Sediments, Vol 15 No 2, p 480-489, Feb 2015

A novel pilot-scale in situ sediment remediation system consists of a hydraulically operated steel casing that houses the mixing tool and provides contained conditions for amendment delivery and mixing to occur. The mixing tool consists of a hollow vertical shaft with horizontal mixing blades for delivering amendments to subaqueous sediments during continuous mixing in the downward or upward vertical direction. In the pilot demonstration, activated carbon was used as a tracer to evaluate the efficiency of reagent delivery and mixing. Better amendment yield recoveries were observed at lower added activated carbon volumes, at higher mixing speeds, at lower pump flow rates, in cases of thicker mixed sediment zones, and at horizontal locations closer to the center shaft. The reagent stayed within the enclosure of the device, indicating that contained mixing conditions were achieved. The in situ remediation system showed potential in terms of successful amendment delivery and mixing into subaqueous sediments. Lower doses of activated carbon were mixed in more efficiently due to the limited availability of pore capacity and issues with powdered activated carbon retention in the sediment. The demonstration took place in sediments with large sand and gravel fractions; sediments containing larger silt and clay fractions are likely to behave differently in terms of sediment resuspension.

#### GROUNDWATER TREATMENT PILOT STUDY REPORT: LONE ELK MARKET CORRECTIVE ACTION, SPRAY, OREGON

Oregon Dept. of Environmental Quality, 235 pp, Sep 2014

This report documents the results of the groundwater treatment pilot study implemented from May through September 2014 at the Lone Elk Market site located in Spray, Oregon. The purpose of the pilot was to assess the viability of using in situ chemical oxidation (ISCO) to address residual petroleum in saturated soil and groundwater. Multiple vendors of suitable ISCO remediation products were consulted, and an acid-activated persulfate compound under development by Peroxychem was selected for use. The scope of work for the pilot persulfate injection included the purchase of ~14,000 lb of oxidant compound; mobilization to the site with the product, batch mixing tank, and injection pump; a pre-injection groundwater monitoring event; mixing the persulfate material; injection of ~16,300 gal of mixed solution into the selected treatment wells; and seven post-injection monitoring events at days 1, 7, 14, 21, 28, 66, and 94 following injection. This report summarizes the injection and groundwater monitoring results. <http://www.deq.state.or.us/Webdocs/Controls/Output/5/pdfHandler.aspx?ps=ba49e741-8e8f-4cdd-8c52-e9a54127a543pdf&cs=1995-GW-Treatment-Pilot-Study-Rpt-09-24-2014.pdf>

#### LHAAP-35B (37) — FORMER CHEMICAL LABORATORY: BIO-PLUG FIELD DEMONSTRATION PILOT STUDY

Longhorn Army Ammunition Plant Environmental Restoration Program, 3 pp, 2015

In February 2012 a field demonstration pilot study of bio-plug technology was initiated at LHAAP-35B (37) to determine the feasibility of the technology to accelerate remediation of chlorinated VOCs (PCE, TCE, and 1,1-DCE) in groundwater and consequently reduce long-term remediation costs and land use restrictions. Bio-plugs are small in situ immobilized microbe bioreactors installed in an array within the contaminated zone. Each bio-plug well is supplied with air and a nutrient distribution system, which is expected to initiate aerobic cometabolism of TCE and other chlorinated VOCs in the groundwater. The bio-plug wells were active for about two years, from September 2012 to October 2014. Monitoring results over the test period indicated that reduction of contaminant concentrations was insufficient to justify continuation of the study, and the system was decommissioned in January 2015. [http://www.caddlakeinstitute.us/docs/LHAAP/2\\_19\\_15%20RAB%20Meeting/Site%2035B%2037%29\\_Remedial\\_Action\\_Operations.pdf](http://www.caddlakeinstitute.us/docs/LHAAP/2_19_15%20RAB%20Meeting/Site%2035B%2037%29_Remedial_Action_Operations.pdf)

### Research

#### AN ENHANCED ADAPTIVE MANAGEMENT APPROACH FOR REMEDIATION OF LEGACY MERCURY IN THE SOUTH RIVER

Foran, C.M., K.M. Baker, N.R. Grosso, and I. Linkov. PLoS ONE, Vol 10 No 2, 2015

An enhanced adaptive management framework was applied to a comparison of remedial alternatives for mercury in the South River near Waynesboro, Virginia, based on a good understanding of the loading and behavior of mercury in the river. The outcomes show that the ranking of remedial alternatives is influenced by uncertainty in the mercury loading model, by the relative importance placed on different criteria, and by cost estimates. The process itself demonstrates that a decision model can link project performance criteria, decision-maker preferences, environmental models, and short- and long-term monitoring information with management choices to help shape a remediation approach that provides useful information for adaptive, incremental implementation. <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0117140>

#### SUSTAINABILITY ASSESSMENT OF EXCAVATION AND DISPOSAL VERSUS IN-SITU STABILIZATION OF HEAVY METAL CONTAMINATED SOIL AT A SUPERFUND SITE IN ILLINOIS

Goldenberg, M. and K.R. Reddy. Geo-Congress 2014 Technical Papers, February 23-26, 2014, Atlanta, Georgia. American Society of Civil Engineers, ISBN: 978-0-7844-1327-2 (DVD), Geotechnical Special Publication 234, 2245-2254, 2014

The Mattheissen and Hegeler Zinc 100-acre smelting site in Illinois was designated a Superfund site in 2005 for its high concentration of heavy metals. The Illinois EPA found Zn present at elevated levels in all samples, and Cd and Pb were elevated in all but one sample. Two alternative treatment methods were evaluated for long-term sustainability: traditional dig, haul, and disposal in a hazardous waste landfill versus in situ solidification-stabilization. The life cycle assessment for each alternative was performed using SimPro for energy inputs and environmental releases through all stages of manufacturing of materials needed for remedial operations, transportation, and remedial implementation. Due to the large quantity of contaminated soil that would have to be excavated and hauled to the nearest landfill, in situ solidification-stabilization was determined to be the more sustainable long-term option. <http://www.uiuc.edu/classes/cemmm/cemmlab/Marat-GeoCongress2014.pdf>

#### IN SITU SEDIMENT TREATMENT USING ACTIVATED CARBON: A DEMONSTRATED SEDIMENT CLEANUP TECHNOLOGY

Patmont, C.R., U. Ghosh, P. LaRosa, C.A. Menzie, R.G. Luthy, M.S. Greenberg, G. Cornelissen, E. Eek, J. Collins, J. Hull, T. Hjartland, E. Glaza, J. Bleiler, and J. Quadri. Integrated Environmental Assessment and Management, Vol 11 No 2, 195-207, 2014

This paper reviews general approaches for applying activated carbon (AC) amendments as an in situ sediment treatment remedy. Over the past decade, pilot- or full-scale field sediment treatment projects using AC were completed at more than 25 field sites in the United States, Norway, and the Netherlands. Collectively, these field projects (along with numerous lab studies) have demonstrated the efficacy of AC for in situ treatment in a range of contaminated sediment conditions. Results from experimental studies and field applications indicate that in situ sedimentation and immobilization treatment of hydrophobic organic compounds using either surface application or mixing in can reduce porewater concentrations and bio-uptake significantly, often becoming more effective over time due to progressive mass transfer. Certain conditions, such as use in unstable sediment environments, should be taken into account to maximize AC effectiveness over long time periods. In situ treatment is generally less disruptive and less expensive than traditional sediment cleanup technologies, such as dredging or isolation capping. This paper is **Open Access** at <http://onlinelibrary.wiley.com/doi/10.1002/ieam.1589/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

Injection of reactive gases such as NH<sub>3</sub> is an innovative remediation technology shown to mitigate uranium contamination in soil. Injection of NH<sub>3</sub> gas causes ammonia gas dissolution in soil moisture, with the formation of ammonium hydroxide (NH<sub>4</sub>OH) and a subsequent increase in pH. This manipulation alters pore water chemistry significantly and affects the dissolution of silica and aluminosilicate from soil minerals, followed by coprecipitation of U(VI) as uranyl (UO<sub>2</sub><sup>2+</sup>) and Al at higher pH conditions. To support the design and operation of a field test for the ammonia treatment technology, 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](http://www.pnnl.gov/main/publications/external/technical_reports/PNNL-23699.pdf)

## ESTIMATION OF GENERIC SUBSLAB ATTENUATION FACTORS FOR VAPOR INTRUSION INVESTIGATIONS

Brewer, R., J. Nagashima, M. Rigby, M. Schmidt, and H. O'Neill.  
Groundwater Monitoring & Remediation, Vol 34 No 4, 79-92, 2014

This paper reviews two of the most commonly used approaches to develop subslab soil gas attenuation factors (SSAFs): (1) comparison of paired indoor air and subslab soil gas data in empirical databases and (2) comparison of estimated subslab vapor entry rates and indoor air exchange rates (IAERs). Potential error associated with databases includes interference from indoor and outdoor sources, reliance on data from basements, and seasonal variability. Heterogeneity in subsurface vapor plumes combined with uncertainty regarding vapor entry points calls into question the representativeness of limited subslab data and diminishes the technical defensibility of SSAFs extracted from databases. The use of reasonably conservative vapor entry rates and IAERs offers a more technically defensible approach for the development of generic SSAF values for screening. Consideration of seasonal variability in building leakage rates, air exchange rates, and interpolated vapor entry rates allows for the development of generic SSAFs at both local and regional scales. Limitations include applicability of the default IAERs and vapor entry rates to site-specific vapor intrusion investigations and uncertainty regarding applicability of generic SSAFs to assess potential short-term variability of impacts to indoor air. This paper is **Open Access** at <http://online.library.wiley.com/doi/10.1111/gwrm.12086.pdf>.

## 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, Universite Laval, Quebec City, 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 Sigma-Lamaque gold mine located in the Abitibi region of Canada. The study was divided into three components: 1) analysis of the community structure of ECM fungi associated with *P. glauca* on four locations near the mining site; 2) development of a lab experiment to select in vitro ECM fungi that were growing well on mine tailings; and 3) evaluation of a glasshouse experiment involving the growth and performance of *P. glauca* seedlings on waste rocks and fine tailings with different treatments of ECM fungi and PGPR. Results suggest that site-adapted ECM fungi and PGPR play a very important role in the health and growth of *P. glauca* on biotite-quartz-rich waste rocks and fine tailings. <http://theses.ulaval.ca/archimede/meta/31233>

## PHYTOSCREENING FOR PERCHLORATE: RAPID ANALYSIS OF TREE SAP

Limmer, M.A., D.M. West, R. Mu, H. Shi, K. Whitlock, and J.G. Burken.  
Environmental Science: Water Research & Technology, Vol 1, 138-145, 2015

To test the potential of phytoscreening for perchlorate, researchers developed a sensitive freeze centrifugation sampling method coupled with ultra-fast ion-exchange chromatography tandem mass spectrometry (UIC-MS/MS) detection. An initial hydroponic greenhouse test using willow cuttings demonstrated that concentrations of perchlorate in tree sap were proportional to the perchlorate exposure concentration. Based upon 86 tree cores obtained in the field, perchlorate distribution in the trees reflected the distribution of perchlorate in the groundwater. Perchlorate concentrations in the tree cores loosely correlated with groundwater concentrations as demonstrated by cross-covariograms and linear regression. Correlations between tree and groundwater perchlorate concentrations were similar in magnitude to tree and groundwater TCE concentrations, suggesting a similar level of performance between perchlorate and TCE phytoscreening at this site. Phytoscreening of perchlorate was sufficiently accurate to be used as a screening tool to delineate areas of perchlorate-contaminated groundwater. Additional information is available in M.A. Limmer's 2014 dissertation at [http://scholarsmine.mst.edu/cgi/viewcontent.cgi?article=3337&context=doctoral\\_dissertations](http://scholarsmine.mst.edu/cgi/viewcontent.cgi?article=3337&context=doctoral_dissertations).

## General News

### ENVIRONMENTAL BIOTECHNOLOGY AND ENGINEERING 2014

Poggi-Varaldo, H.M., L.M. Breton-Deval, B. Camacho-Perez, et al. (eds).  
Bonumedia, ISBN Complete: 978-607-9023-27-0, 3 Volumes, 2014

The proceedings of the Fourth International Symposium on Environmental Biotechnology and Engineering, held September 9-12, 2014, in Mexico City, have been published in three volumes of edited papers and posted online for public use. The 4ISEBE was organized by several international organizations and a consortium of Mexican institutions to gather state-of-the-science contributions to the sustainable development and sustainable management of resources in modern societies. Among the 17 topic tracks are sections on aquifer remediation, soil and sediment remediation, hazardous waste management and treatment, and environmental nanotechnology. Although many of the papers are written in English, some are in Spanish.  
<http://isebe.cinvestav.mx/EnvironmentalBiotechnologyandEngineering.aspx>

### ECONOMIC ANALYSIS OF JOB CREATION FROM SITE REMEDIATION

Birkbeck, P., D. Plenderleith, P. Bruleigh, and V. Velkoff-Woo.  
2014 RPIC Federal Contaminated Sites National Workshop, 14-16 April, Ottawa, Ontario, 17 slides, 2014

An economic analysis of the economic benefits of Canadian federal site remediation projects was conducted using actual data to produce a composite measure of job creation for Federal Contaminated Sites Action Plan remediation expenditures in terms of annual FTE jobs per one million dollars of project expenditures. Previous estimates of the job creation aspect of site remediation projects expenditures had used Statistics Canada employment categories based on estimates of average salaries by standard industry sectors; however, there is no specific industry sector for environmental remediation. This project was able to get actual labor duration and actual costs from six remediation projects (total project costs of \$89M) to generate a remediation project-specific multiplier, encompassing engineering, technical, and construction workers. The analysis showed a range from 6.29 to 2.79 annual FTE/\$1M, with a median of 4.54 FTE/\$1M for direct job creation. A specific analysis at Sydney Tar Ponds gave 3.43 FTE/\$1M, and a French study produced a result of 3.13 FTE/\$1M. An additional 1.7 FTE/\$1M may be attributed to indirect job creation. The job creation aspect of a \$11M contaminated soil remediation project at Houpsitas on Vancouver Island is presented as an example.  
[http://www.rpic-ibic.ca/documents/RPIC\\_FCS2014/Presentations/1-Plenderleith\\_Final\\_RPIC\\_2014\\_CS\\_Economic\\_Analysis\\_of\\_Job\\_Creation\\_-\\_FN.pdf](http://www.rpic-ibic.ca/documents/RPIC_FCS2014/Presentations/1-Plenderleith_Final_RPIC_2014_CS_Economic_Analysis_of_Job_Creation_-_FN.pdf)

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