

# Technology Innovation News Survey

## Entries for March 1-15, 2019

### Market/Commercialization Information

#### FUSRAP REMEDIAL ACTION SERVICES AT THE ST. LOUIS SITES

Department of the Army, U.S. Army Corps of Engineers, USACE District St. Louis, MO.  
Federal Business Opportunities, Solicitation W912P919R0020, 2019

This solicitation is a total small business set-aside under NAICS code 562910. This Single-Award Task-Order Contract (SATOC) requires personnel, material, and equipment support services for the St. Louis District FUSRAP project. The work encompasses any and all work for remedial actions, consisting primarily of removal of low-level radioactive contaminated material, including thorium, radium and uranium, with co-located non-radiological contamination such as cadmium and arsenic. Task Orders issued under this contract will be cost-reimbursable as cost-plus-fixed-fee. Responses are due by 2:00 PM CT on May 7, 2019. The incumbent remediation contractor is HydroGeologic Inc. <https://www.fbo.gov/notices/f022b1059cc8b2e07582c7b010e3e067>

#### BRAC ENVIRONMENTAL CONSTRUCTION OPTIMIZATION SERVICES (BECOS) 2020

Department of the Air Force, AFICA - CONUS, WPAFB, OH.  
Federal Business Opportunities, Solicitation FA8903-18-BRAC-RFI-01, 2019

The U.S. Air Force has issued an additional request for information (RFI), expanding upon its RFI last year of April 13, 2018, to request additional input from Industry to advance the acquisition planning process. The attachments to the FedBizOpps notice contain a new list of questions and an Excel spreadsheet in which to enter the responses, which are due via email by 12:00 noon CT on April 30, 2019. <https://www.fbo.gov/notices/3a7eec937590ed1eafda9d8dda37b011>

#### USACE ALASKA DISTRICT \$140M ENVIRONMENTAL REMEDIATION SERVICES

U.S. Army Corps of Engineers, USACE District, Alaska.  
Federal Business Opportunities, Solicitation W911KB19R0007, 2019

This solicitation is a total small business set-aside, NAICS code 562910, size standard 750 employees. The acquisition for Environmental Remediation Services multiple-award task-order contracts (MATOC), primarily in Alaska, will be awarded as IDIQ task-order contracts consisting of a 3-year base period and two 1-year option periods. The Government intends to award up to five small business IDIQ contracts that will share the overall capacity of \$140M. No contract award can be made to an offeror whose accounting system has not been approved as adequate for cost reimbursement contracts. Responses are due by 2:00 PM Alaska Time on May 1, 2019. <https://www.fbo.gov/spg/USA/COE/DACA85/W911KB19R0007/listing.html>

#### REQUEST FOR INFORMATION: AMMONIUM NITRATE SOLUTION (ANSOL) BY-PRODUCT DISPOSITION TECHNOLOGIES

Department of the Army, Army Contracting Command, ACC - RI (W52P1J), Rock Island, IL.  
Federal Business Opportunities, Solicitation W52P1J19ANSOL, 2019

The objective of this request for information is to assist the Government in evaluating available technologies to address by reuse, recycle, treatment, or disposal of the ANSol by-product of explosives production in a safe, cost-effective, and environmentally responsive manner. ANSol is an oxidizer whose chemical composition varies due to normal changes in production operations. The ammonium nitrate solids concentration can vary from 51-67%. Pure ANSol in and of itself has the potential to be detonatable. The Government anticipates that a mature technology alternative, implementable on-site at the Holston Army Ammunition Plant, Kingsport, TN, can be identified to address this by-product material. The potential technology alternative must be a commercial off-the-shelf (COTS) technology and meet the list of additional requirements specified in the FedBizOpps notice. Statements of capability from Industry are due by 11:59 PM CT on April 30, 2019. <https://www.fbo.gov/notices/ec8fee26ec636edbc88fab7b4a0c19ba>

#### EXPRESSIONS OF INTEREST: SUPPLEMENTAL ORGANIC TREATMENT

U.S. DOE, Washington River Protection Solutions LLC, Office of River Protection.  
Federal Business Opportunities, Solicitation EOI-KJF-19-04-01, 2019

Washington River Protection Solutions seeks expressions of interest from contractors capable of providing a supplemental organic treatment system for the 200 Area Effluent Treatment Facility (ETF) at DOE's Hanford Site. The main treatment train at ETF currently eliminates the hazardous characteristics of the waste and allows for delisting the effluent. Beginning around January 2022, the ETF will receive a new wastewater stream that will be generated nearly continuously for a period of ~40 years and is anticipated to contain at least four organic constituents-acetonitrile, acrylonitrile, acetone, and methylene chloride-in concentrations that exceed the expected performance range for the existing system. Input is requested from Industry to enable an evaluation of an off-the-shelf procurement and a procurement/design activities solution to meet the future requirement. Expressions of interest are due by 9:00 AM PT on May 6, 2019. <https://www.fbo.gov/spg/DOE/CHG/GRP/EOI-KJF-19-04-01/listing.html>

#### TA-21 DP WEST SLABS D&D AND REMEDIATION PROJECT

Newport News Nuclear BWXT-Los Alamos, LLC (DOE Contractor), Los Alamos, NM.  
Federal Business Opportunities, Solicitation RFP-0000300, 2019

Offerors are required to provide notice of INTENT TO BID no later than 3:00 PM MT on April 22, 2019, via email. This unrestricted procurement will result in a firm-fixed-price contract, NAICS code 562910. Successful offeror (subcontractor) shall furnish qualified management, personnel, equipment, materials, supplies and facilities to perform deactivation, decommissioning, and remediation activities at Technical Area 21 located in Los Alamos, New Mexico. Work scope includes abatement of hazardous materials, completion of site/waste characterization, sampling, reporting, and remediation of remaining facilities, structures, industrial waste and utility lines, and removal of contaminated soils. The successful offeror will also be required to locate, excavate, remove, package and load the DP West radiological industrial waste lines (~ 2,000 LF) and asbestos piping (~500 LF) and perform human health and ecological risk assessments and investigation report development necessary to meet New Mexico ED Compliance Order on Consent requirements. Offers are due by 3:00 PM MT on May 17, 2019. Proposals must be submitted utilizing the forms provided as attachments to the FedBizOpps notice. <https://www.fbo.gov/notices/a17a1d58f2b3bd2249d82bdc7e1bbc3e>

### Cleanup News

#### IN SITU CHEMICAL OXIDATION: LESSONS LEARNED AT MULTIPLE SITES

Pac, T.J., J. Baldock, B. Brodie, J. Byrd, B. Gil, K.A. Morris, D. Nelson, J. Parikh, et al.  
Remediation 29(2):75-91(2019)

This paper compiles a detailed set of in situ chemical oxidation (ISCO) lessons learned pertaining to design, execution, and safety based on global experiences over the last 20 years. While the benefits of a correct application are known, history also provides examples of a variety of incorrect applications that provide an opportunity to highlight recurring themes that resulted in failures. This paper combines a

thorough discussion of lessons learned through decades of ISCO implementation throughout all aspects of ISCO projects with an analysis of changes to the ISCO remediation market. By discussing the interplay of these two themes and providing recommendations from collective lessons learned, the future of safe, cost-effective, and successful applications of ISCO can be improved.  
<https://onlinelibrary.wiley.com/doi/epdf/10.1002/rem.21591>

#### **TRACKING FULL-SCALE PERFORMANCE OF AN INJECTABLE SORPTIVE BIOBARRIER: ONE YEAR AND BEYOND**

Sheldon, J., D. Bush, C. Sandefur, and D. Nunez.

Abstract Book: AEHS Foundation 29th Annual International Conference on Soil, Water, Energy, and Air, 18-21 March 2019, San Diego, CA. p 39, 2019

A full-scale remediation using an injectable sorptive biobarrier downgradient of a service station site impacted with MTBE and TBA was conducted in Daly City, Calif. The results span more than one year post-injection of PlumeStop® Liquid Activated Carbon. Biodegradation played a key role in the on-site remediation and continues to play a key role in the off-site reduction of MTBE and TBA concentrations. See slides for more information: <https://www.slideshare.net/AnteaGroupUSA/pilot-testing-a-sorptive-biomatrix-as-an-mtbe-barrier> and <https://www.slideshare.net/AnteaGroupUSA/optimizing-a-sorptive-biomatrix-mtbe-barrier-94995976>.

#### **PHASED REMEDIATION AT THE NUCLEAR METALS, INC. SUPERFUND SITE**

Thompson, B. | RemTEC Summit, February 26-28, 2019, Denver, Colorado. 33 slides, 2019

Nuclear Metals Inc. in Concord, Mass., operated 1958-2011, producing depleted uranium (DU) penetrators and other DU products, beryllium parts, and metal powders. The site was placed on the National Priorities List in 2001. A remedial investigation/feasibility study resulted in EPA's 2015 selection of a \$125-million remedy for soil, sediment and groundwater. Buildings were emptied, demolished and disposed of off-site 2011-2016 through a \$70-million non-time-critical removal action (NTCRA). Increasing 1,4-dioxane concentrations at a municipal well resulted in the ROD including a second NTCRA to expedite hydraulic containment and ex situ treatment. The success of a field pilot of the innovative Vanox™ ex situ UV advanced oxidation process to address 1,4-dioxane led to the installation of a full-scale treatment system. <https://www.remtecsummit.com/ext/resources/Static-Pages/presentations/Bruce-Thompson.pdf>.

#### **FULL SCALE IN-SITU GASEOUS REDUCTION OF HEXAVALENT CHROMIUM IN VADOSE ZONE SOILS WITH H<sub>2</sub>S GAS**

Craig, K. | RemTEC Summit, February 26-28, 2019, Denver, Colorado. 24 slides, 2019

Hydrogen sulfide (H<sub>2</sub>S) was used to remediate Cr(VI) in vadose zone soils beneath a former plating shop. Although well above groundwater, treatment of the Cr(VI) through standard approaches was infeasible due to the overlying structure or inadvisable due to the potential to mobilize Cr(VI) to groundwater. After direct excavation of the accessible impacted soil in the upper 10 ft, an in situ gas reduction treatment area was established around the limited area with deeper impacts. The H<sub>2</sub>S injection/extraction system was designed and built to inject an inline stream of H<sub>2</sub>S gas into a nested injection well at a concentration of ~500 ppm, while simultaneously extracting from a ring of extraction wells to control and treat excess H<sub>2</sub>S gas. Post-remediation sampling of the soil within the treatment area showed excellent Cr(VI) reduction, leading to a no-further-action determination.  
<https://www.remtecsummit.com/ext/resources/Static-Pages/presentations/Kirk-Craig.pdf>

#### **USING REAL-TIME DATA MONITORING DURING LARGE DIAMETER AUGER DRILLING WITH STEAM AND ZERO-VALENT IRON INJECTION TO EVALUATE CONCEPTUAL SITE MODEL EFFECTIVENESS AND OPTIMIZE REMEDY IMPLEMENTATION**

Langenbach, J. | RemTEC Summit, February 26-28, 2019, Denver, Colorado. 29 slides, 2019

A remedial strategy used a large-diameter auger drilling with steam and zero-valent iron injection (ZVI) system to remediate a PCE source and facilitate a transition to long-term monitoring. An 8-ft diameter auger simultaneously mixed the subsurface and introduced hot air/steam to volatilize and strip chlorinated volatile organic compounds (CVOCs) from soil and groundwater, followed by injection of ZVI as a polishing step to provide treatment of residual CVOCs. During three months of remedy implementation, 500 lbs of PCE were extracted and treated. Utilizing real-time data collection and an adaptive treatment protocol enabled immediate responses to boring-specific data observations and optimized remedial efforts to maximize treatment efficiency. Post-processing of the real-time data was performed to calculate the CVOc mass removed from each treatment boring and to visually present the distribution of mass recovered from each boring and throughout the treatment area. Over one year of post-remediation performance monitoring documented that the remedial objectives were achieved with no CVOc rebound.  
<https://www.remtecsummit.com/ext/resources/Static-Pages/presentations/Jim-Langenbach.pdf>

#### **INSTALLATION, OPERATION AND STARTUP OF AUSTRALIA'S FIRST REGENERABLE RESIN SYSTEM FOR PFAS REMOVAL**

Woodard, S. | RemTEC Summit, February 26-28, 2019, Denver, Colorado

A 200-gpm regenerable ion exchange (IX) resin system was installed in spring 2018 to remove PFAS from groundwater at the Royal Australian Air Force Base Williamtown. The system includes pretreatment filtration to remove suspended solids, IX resin to remove fouling agents (including iron and natural organic matter), specialized IX resins for PFAS removal, and an in-vessel regeneration process used to strip PFAS from the IX resin. Influent concentrations to the full-scale system range from 18 to 410 µg/L. More information: <http://www.defence.gov.au/environment/pfas/williamtown/managementactivities.asp>

## **Demonstrations / Feasibility Studies**

#### **POST-REMEDIAL EVALUATION OF EVO TREATMENT: HOW CAN WE IMPROVE PERFORMANCE?**

Borden, R.

Project ER-201581, Excel Spreadsheet Design Tool, 2018

Conclusions and lessons learned in this demonstration project were integrated with prior lab and field studies to generate a general conceptual model of enhanced reductive dechlorination (ERD) with emulsified vegetable oil (EVO) and pH buffer. The conceptual model on which this design tool is based provides a relatively concise summary of the current understanding of ERD with EVO, including (1) ERD microbiology and organohalide respiration; (2) environmental requirements for efficient dechlorination; (3) EVO properties, transport and retention in the subsurface; (4) EVO consumption during ERD; (5) aquifer pH and buffering; and (6) injection system design.

Additional information: Excel Spreadsheet Design Tool

<https://www.serdp-estcp.org/content/download/48432/460804/file/Base%20Add%20Design%20Tool%20-%20Dec%202018.xlsx>

#### **PILOT-SCALE PYROLYTIC REMEDIATION OF CRUDE-OIL-CONTAMINATED SOIL IN A CONTINUOUSLY-FED REACTOR: TREATMENT INTENSITY TRADE-OFFS**

Song, W., J.E. Vidonish, R. Kamath, P. Yu, C. Chu, B. Moorthy, B. Gao, K. Zygourakis, et al.

Environmental Science and Technology 53(4):2045-2053(2019)

A pilot-scale study assessed the effectiveness of pyrolytic remediation of crude-oil-contaminated soil using a continuously fed rotary kiln reactor. Treatment at 420°C with 15 min of residence time resulted in high removal efficiencies for both total petroleum hydrocarbons (TPH) (99.9%) and polycyclic aromatic hydrocarbons (PAHs) (94.5%) and restored fertility to clean soil levels. TPH and PAH removal efficiencies increased with increasing treatment intensity (i.e., higher temperatures and longer residence times). However, higher treatment intensities decreased soil fertility, suggesting that there is an optimal system-specific intensity for fertility restoration.

#### **"FIRE IN THE HOLE" - INDUCED SECONDARY PERMEABILITY OF A LOW K FORMATION: WHAT A BLAST!**

Luhrs, B. | RemTEC Summit, February 26-28, 2019, Denver, Colorado. 32 slides, 2019.

Wells at the Austin Chalk formation were taking ~6-9 months to recharge back to static water level after installation. In response to a shortened project schedule due to impending redevelopment, alternative and innovative options were explored to expedite remedial

actions and enhance the success of treatment injections. Two approaches were used: hydro fracking and 198 focused explosive charges. Lessons learned range from types and amounts of charges, grid spacing, appropriate density of water-level measurements, changes to the vadose zone, and impacts to formation permeability.  
<https://www.remtecsummit.com/ext/resources/Static-Pages/presentations/Bob-Luhrs.pdf>

#### **DEMONSTRATION/VALIDATION OF MORE COST-EFFECTIVE METHODS FOR MITIGATING RADON AND VOC SUBSURFACE VAPOR INTRUSION TO INDOOR AIR**

McAlary, T., W. Wertz, and D. Mali.  
ESTCP Project ER-201322, 1346 pp, 2018

New lines of evidence and mathematical modeling were developed to aid in the design and performance monitoring of subslab venting systems for mitigation of radon and VOC vapor intrusion to protect the health of building occupants from inhalation exposures. Results indicate that system performance depends strongly on the relative permeability of the floor slab and the material below the floor slab, and that both parameters can be determined with reasonable confidence using tests and analysis that are rapid and affordable. Where coarse granular fill is present below a high quality floor slab, the radius of influence may extend to considerable distances, which reduces the number of suction points required and the associated capital cost. Where a system already exists, mass emission monitoring may help reduce the operation, maintenance, and monitoring costs.

<https://www.serdp-estcp.org/content/download/48949/466762/file/ER-201322%20Final%20Report.pdf> Additional information:  
Executive Summary at <https://www.serdp-estcp.org/content/download/49023/467416/file/ER-201322%20Executive%20Summary.pdf>

#### **SOURCE BARRIER TOOL: CONTAMINANT FLUX REDUCTION BARRIERS FOR MANAGING DIFFICULT-TO-TREAT SOURCE ZONES IN UNCONSOLIDATED MEDIA**

Newell, C.  
ESTCP Project ER-201328, 111 pp, 2018

This tool explains the potential benefits of a physical barrier around a chlorinated solvent source zone and helps the user understand if a barrier would work at a particular site. The overall objective of this project was to evaluate if inexpensive flow reduction agents delivered via permeation grouting technology could help manage difficult-to-treat chlorinated solvent source zones, or any other source zone comprising contaminants that degrade primarily via anaerobic biodegradation processes inhibited by naturally occurring competing electron acceptors, such as oxygen and sulfate. Additional information: Source Barrier Tool

<https://www.serdp-estcp.org/content/download/48809/465123/file/ER-201328%20Source%20Barrier%20Tool.pdf>

#### **NEW ADSORPTION MEDIA TECHNOLOGY MEETS WATER-TREATMENT CHALLENGES**

Smathers, C.J., T. Jackson, S. Buckwald, R. Gonzalo, and R. McPherson.  
Journal of Petroleum Technology 70(6):(2018)

The performance of Osorb with live fluids was evaluated during a technology demonstration in Oman in collaboration with Petroleum Development Oman and Qatar Petroleum. An automated pilot OMS was placed inside the Marmul Water Treatment Plant to treat water from a CEOR operation using polymer to increase oil recovery. The system was placed downstream of the free-water knockout and upstream of the primary water treatment system which consisted of induced gas flotation vessels and nutshell filters. The goal of the demonstration was to reduce the OIW to less than 5 mg/L using only the OMS. The field trial was split into two phases, differing in the method of regeneration. A total of 4,300 bbl of produced water were treated by the OMS with eight regenerations. The inlet OIW averaged 59 mg/L and fluctuated from 12-202 mg/L over the eight cycles, while the outlet OIW averaged less than 1 mg/L. The media maintained greater than 90% oil removal efficiency after each regeneration cycle.

<https://www.spe.org/en/jpt/jpt-article-detail/?art=4193>

## **Research**

#### **RESEARCH BRIEF 290: PROMISING MEMBRANE TECHNOLOGY REDUCES CHLOROBENZENE IN GROUNDWATER**

National Institute of Environmental Health Sciences, Superfund Research Program, February 2019

A new Superfund Research Program collaboration has developed a promising groundwater cleanup technology that provides an efficient, low-maintenance method of removing chlorobenzene and other compounds from water. The method integrates electrochemical oxidation, which uses electricity to transform contaminants into non-toxic substances, and membranes containing palladium, a metal used as a catalyst in many industrial chemical synthesis applications and groundwater treatment.

[https://tools.niehs.nih.gov/srp/1/ResearchBriefs/pdfs/SRP\\_ResearchBrief\\_290\\_508.pdf](https://tools.niehs.nih.gov/srp/1/ResearchBriefs/pdfs/SRP_ResearchBrief_290_508.pdf)

#### **INTEGRATION OF NANOSCALE ZERO-VALENT IRON AND FUNCTIONAL ANAEROBIC BACTERIA FOR GROUNDWATER REMEDIATION: A REVIEW**

Dong, H., L. Li, Y. Lu, Y. Cheng, Y. Wang, Q. Ning, B. Wang, L. Zhang, and G. Zeng.  
Environment International 124:265-277(2019)

This review focuses on the interactions between nanoscale zero-valent iron (nZVI) and three kinds of functional anaerobic bacteria commonly used in anaerobic bioremediation. The coupling effects of nZVI and the functional bacteria on the contaminant removal in the integrated system are summarized. In addition, this review also discusses the main factors influencing the removal efficiency of contaminants in the integrated treatment system, including nZVI species and dosage, inorganic ions, organic matters, pH, type of pollutants, temperature, and carbon/energy sources, etc. Lastly, the future research needs are proposed to better understand this integrated technology and effectively apply it in groundwater remediation. *This article is **Open Access** at*

<https://www.sciencedirect.com/science/article/pii/S0160412018330204>.

#### **ENHANCEMENT OF GASWORKS GROUNDWATER REMEDIATION BY COUPLING A BIO-ELECTROCHEMICAL AND ACTIVATED CARBON SYSTEM**

Kirmizakis, P., R. Doherty, C.A. Mendonca, R. Costeira, C.C.R. Allen, et al.  
Environmental Science and Pollution Research 26(10):9981-9991(2019)

A graphite-chambered bio-electrochemical system (BES) that utilizes granular activated carbon (GAC) as both sorption agent and high surface area anode was tested for its ability to remediate hydrocarbon-contaminated groundwater from a gasworks site in Northern Ireland. The BES chambers were effectively colonized by the bacterial communities from the contaminated groundwater. Principal coordinate analysis of UniFrac Observed Taxonomic Units (OTUs) showed distinct grouping of microbial types that are associated with the presence of GAC and grouping of microbial types associated with electroactivity. Rhodocyclaceae- and Comamonadaceae-related OTU were observed to increase in BES cells. The GAC BES (99% removal) outperformed the control graphite GAC chamber, as well as a graphite BES and a control chamber both filled with glass beads. *This article is **Open Access** at*  
<https://link.springer.com/content/pdf/10.1007%2Fs11356-019-04297-w.pdf>.

#### **BENCH-SCALE STUDY TO EVALUATE THE USE OF ADSORPTIVE MEDIA IN A PERMEABLE BARRIER TO REMOVE PFAS FROM LANDFILL GROUNDWATER**

Barajas, F. | RemTEC Summit, February 26-28, 2019, Denver, Colorado. Poster, 2019

In this study, bench-scale laboratory experiments were set up to demonstrate the effectiveness of materials such as natural soil, wood

shavings, and biochar used in a permeable barrier for removing PFAS from groundwater, as well as to optimize the composition of the media used. The experimental approach was conducted in two separate phases that included batch and flow-through experiments. The results will provide insights on the use of certain materials to improve the removal of PFAS when using permeable barriers, how those barriers can be designed based on the media recipe, and information about the adsorptive capacities of such media.  
<https://www.remtecsummit.com/ext/resources/Static-Pages/presentations/Francisco-Barajas.pdf>

#### **ADDRESSING THE CHALLENGES IN SOURCE ZONE CHARACTERIZATION AND REMEDIATION: RECENT PROGRESS**

Abriola, L. | RemTEC Summit, February 26-28, 2019, Denver, Colorado. 33 slides, 2019

Recent results of interdisciplinary research, sponsored by SERDP, were designed to improve understanding of the processes controlling the fate of DNAPL in heterogeneous subsurface formations and to develop improved methodologies for source zone characterization and management. Numerical simulations and experimental observations are used to illustrate advances in our understanding of the hydrologic and abiotic/biotic transformation processes influencing source zone persistence. The presentation also highlights research demonstrating the potential utility of innovative methods based upon machine-learning techniques for site characterization and risk assessment. <https://www.remtecsummit.com/ext/resources/Static-Pages/presentations/Linda-Abriola.pdf>

#### **IN-SITU ADSORPTION OF PER- AND POLYFLUORINATED ALKYL SUBSTANCES (PFAS) FOR REMEDIATION OF CONTAMINATED GROUNDWATER**

Fagerlund, F., L. Ahrens, M. Soerengard, E. Oestblom, D.B. Kleja, J. Bergman, et al.  
European Geosciences Union General Assembly 2018, 8-13 April, Vienna, Austria, 2018

The StopPFAS project is aimed at developing in situ methods to efficiently sorb and immobilize PFASs in plumes in groundwater originating from hot spot areas. Different sorbents were tested for their ability to adsorb PFASs under various conditions relevant to field sites. Preliminary results indicate that activated carbon sorbents are promising candidates for in-situ adsorption of PFASs in groundwater. The site investigations indicate that local hydrological and geological conditions (e.g., soil characteristics) are important for the application of sorbents in the field and pose challenges for efficient implementation of sorbent-based, in situ PFAS remediation. See slides from a previous presentation for more information: [https://www.slideshare.net/SGU\\_Sverige/stoppfas-fritiof-fagerlund-mfl](https://www.slideshare.net/SGU_Sverige/stoppfas-fritiof-fagerlund-mfl)

### **General News**

#### **NEW PERSPECTIVES IN THE USE OF HORIZONTAL WELLS FOR ASSESSMENT AND REMEDIATION**

Koenigsberg, S.S., E.R. Piatt, and L.I. Robinson.  
Remediation 28(4):45-50(2018)

Decreasing costs and a strategic shift are two factors that have brought about a resurgence of horizontal well systems. Cost savings can be achieved when moving from monolithic single well systems to segmented well systems, which is an advance in site assessment and remediation. Nested, discrete horizontal profiling can be used to assess sites accurately, especially those challenged by access issues, and provides more directed treatment operations with flexibility in dynamic groundwater systems. Conceptual site models can be enhanced with new perspectives and, depending on the situation, may provide significant economic advantages in deployment. They create a new paradigm in contrast, or rather as an adjunct, to vertical profiling and high-resolution site characterization and open up a new strategic approach that can be called high-resolution contaminant distribution.  
<https://enrxinc.com/wp-content/uploads/Koenigsberg-et-al-New-Perspectives-In-The-Use-Of-Horizontal-Wells-Autumn-2018.pdf>.

#### **THE REMCHLOR-MD GROUNDWATER TRANSPORT AND REMEDIATION MODEL FOR SITES WITH MATRIX DIFFUSION**

Falta, R., C. Newell, and S. Farhat.  
SERDP/ESTCP Webinar Series, Webinar #84, Feb 2019

An alternative numerical modeling approach has been developed that uses semi-analytical approximations inside each normal (large) gridblock to represent local-scale matrix diffusion. The new method is efficient and compares well with laboratory experiments and exact analytical solutions for transient matrix diffusion in aquifer/aquitard systems and in fractured porous media. This modeling technique has been implemented in a new version of the contaminant transport screening model REMChlor, called REMChlor-MD. The REMChlor-MD model retains the remediation capabilities of the original REMChlor model, while allowing for matrix diffusion in the plume. The model considers first order decay and production of daughter products in both the high and low permeability parts of the domain, with independent decay rates and retardation factors for the individual species in the two zones. Contaminant reaction rates can be varied in space and time in either or both domains to simulate plume remediation actions.

<https://www.serdp-estcp.org/Tools-and-Training/Webinar-Series/02-07-2019>. Free download of the new model at <https://www.serdp-estcp.org/Program-Areas/Environmental-Restoration/Contaminated-Groundwater/Persistent-Contamination/ER-201426>

#### **MANAGING RISKS AND LIABILITIES ASSOCIATED WITH PER AND POLYFLUOROALKYL SUBSTANCES (PFAS)**

Technical Bulletin. CL:AIRE (Contaminated Land: Applications in Real Environments), London, UK. TB19, 14 pp, 2019

This technical bulletin is intended to provide a short summary of per- and polyfluoroalkyl substances (PFASs) chemicals and highlight approaches to effectively and pragmatically manage risks and liabilities associated with PFASs impact to the environment such as soil and groundwater in the UK and globally. A more comprehensive and detailed review considering management of the environmental challenges posed by PFASs is presented through recent publications and guidance documents.

<https://www.claire.co.uk/component/phocadownload/category/17-technical-bulletins>

#### **INTEGRATION OF NANOSCALE ZERO-VALENT IRON AND FUNCTIONAL ANAEROBIC BACTERIA FOR GROUNDWATER REMEDIATION: A REVIEW**

Dong, H., L. Li, Y. Lu, Y. Cheng, Y. Wang, Q. Ning, B. Wang, L. Zhang, and G. Zeng.  
Environment International 124:265-277(2019)

This review focuses on the interactions between nanoscale zero-valent iron (nZVI) and three kinds of functional anaerobic bacteria commonly used in anaerobic bioremediation. The coupling effects of nZVI and the functional bacteria on contaminant removal in the integrated system are summarized. In addition, this review also discusses the main factors influencing the removal efficiency of contaminants in the integrated treatment system, including nZVI species and dosage, inorganic ions, organic matters, pH, type of pollutants, temperature, and carbon/energy sources, etc. Lastly, future research needs are proposed to better understand this integrated technology and effectively apply it in groundwater remediation. *This article is **Open Access** at*  
<https://www.sciencedirect.com/science/article/pii/S0160412018330204>

#### **GROUNDWATER REMEDIATION IN LOW-PERMEABILITY SETTINGS: THE EVOLVING SPECTRUM OF PROVEN AND POTENTIAL**

Horst, J., M. Schnobrich, R. Oesterreich, and J. Munholland.  
Groundwater Monitoring and Remediation 39(1):11-19(2019)

Low-permeability aquifer settings continue to pose significant challenges for owners and their consultants. In this column, what constitutes a low-permeability setting is discussed with exploration of a selection of technologies that reflect both demonstrated and promising new approaches across a spectrum of strategies ranging from complete treatment to source reduction to flux control. Finally, what this current state of technology means to the practice of restoration in low-permeability settings is considered, with an eye toward

contaminant flux reduction/control versus complete treatment. *This article is **Open Access** at <https://onlinelibrary.wiley.com/doi/full/10.1111/qwmr.12316>.*

#### **OVERVIEW OF IN SITU AND EX SITU TECHNOLOGIES IN DEVELOPMENT FOR THE TREATMENT OF PER- AND POLYFLUOROALKYL SUBSTANCES**

Houtz, E. | California EPA Webinar, 5 April, Sacramento, CA, 2019.

This webinar covers conventional and innovative technologies to address PFASs in water and soil. Remediation of groundwater often requires a treatment train, combining conventional sorbents and engineered filtration with more innovative and emerging remediation solutions for PFASs. While in situ soil stabilization is a promising technique, ongoing research and development is being conducted to evaluate the longevity of fixation amidst circumneutral pH and biotransformation, which may enhance PFAS dissolution. Remediation of PFAS source zones and the associated groundwater plumes presently requires multiple technologies to protect human health in a cost-conscious manner. *See a recording of the presentation at <https://www.waterboards.ca.gov/pfas/>.*

#### **DEBUNKING MYTHS ABOUT SUSTAINABLE REMEDIATION**

Smith, J.W.N. | Remediation 29(2):7-15(2019)

With the recent publication of ISO Standard 18504 and the benefit of a decade's worth of hindsight on sustainable remediation programs implementation and project delivery, this paper summarizes myths and misunderstandings that have been stated regarding sustainable remediation and seeks to debunk them. In dispelling some of the myths about sustainable remediation set out in this paper, it is hoped that consistent application of ISO18504/SuRF-UK (or equivalently robust guidance) will facilitate even wider use of sustainable remediation around the world. *This article is **Open Access** at <https://onlinelibrary.wiley.com/doi/epdf/10.1002/rem.21587>. *ISCO18504 document <https://www.iso.org/obp/ui/#iso:std:iso:18504:ed-1:v1:en>. See slide for more information [http://seminario.ekosbrasil.org/wp-content/uploads/2018/11/5\\_Session-1\\_Nicola-Harries.pptx.pdf](http://seminario.ekosbrasil.org/wp-content/uploads/2018/11/5_Session-1_Nicola-Harries.pptx.pdf)**

#### **FREQUENTLY ASKED QUESTIONS ABOUT THE DEVELOPMENT AND USE OF BACKGROUND CONCENTRATIONS AT SUPERFUND SITES: PART ONE, GENERAL CONCEPTS**

U.S. EPA, Office of Superfund Remediation and Technology Innovation, OLEM Directive 9200.2-141, 20 pp, 2018

U.S. EPA has addressed the role of background concentrations in the Superfund site assessment and remediation processes in a variety of guidance documents. OSRTI has compiled excerpts and citations from relevant guidance documents into a set of frequently asked questions (FAQs) to answer basic questions about the definition and use of background data, including how a background dataset is generally developed and used in the different stages of site assessment and remediation. This document does not establish new guidance. *Part Two: Statistical Concepts* is still in development. <https://semspub.epa.gov/src/document/HQ/100001657>

#### **GROUNDWATER STATISTICS TOOL: USER'S GUIDE**

U.S. EPA, Office of Superfund Remediation and Technology Innovation, 36 pp, 2018

This statistics tool is a Microsoft Excel workbook designed to help evaluate contaminant of concern concentrations on a well-by-well basis to determine whether a groundwater restoration remedial action is complete. The tool is designed to support EPA's "Guidance for Evaluating Completion of Groundwater Restoration Remedial Actions," (2013) and to comport with principles outlined in the "Recommended Approach for Evaluating Completion of Groundwater Restoration Remedial Actions at a Groundwater Monitoring Well" (EPA 2014). Both guidance documents should be reviewed before using the tool. The two phases of the groundwater restoration process that the tool is designed to evaluate are the remediation monitoring phase and the attainment monitoring phase. <https://semspub.epa.gov/src/document/HQ/100001733> Version 2 of the Excel Groundwater Statistics Tool (2018) is available at <https://semspub.epa.gov/src/document/HQ/100001734>.

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](mailto:adam.michael@epa.gov) or (703) 603-9915 with any comments, suggestions, or corrections.

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