Technology Innovation News Survey

Entries for February 1-15, 2015

Market/Commercialization Information

SOURCES SOUGHT FOR ENVIRONMENTAL PLANNING, COMPLIANCE, AND REMEDIATION TECHNICAL SERVICES (EPCARTS)
U. S. Army Space and Missile Defense Command/Army Forces Strategic Command.
Federal Business Opportunities, FBO-4856, Solicitation W9113M-15-R-0005, 2015

For purposes of market research, the Government is seeking to understand the capability and capacity of all 8(a) firms interested in supporting this requirement for environmental remediation, environmental engineer technical support, environmental special studies, and environmental siting support services. Responses to this notice will be used to develop the acquisition strategy for this requirement. Questions regarding the scope of work or acquisition strategy will not be accepted at this time. The contemplated contract type is a single-award indefinite-delivery, indefinite-quantity task order arrangement. The anticipated period of performance is a five-year ordering period (two-year base and three one-year options). The estimated contract ceiling is $48M. The applicable NAICS code is 562910, with a size standard of 500 employees. Responses will be accepted ONLY from firms interested in being a prime contractor. Responses are due no later than 4:00 PM CT, Friday, April 10, 2015https://www.fbo.gov/notices/9960dc6069d93f7a7522346963935978

ENVIRONMENTAL RISK MANAGEMENT PROGRAM
Department of the Interior, U.S. Geological Survey (USGS), Reston, VA.
Federal Business Opportunities, FBO-4849, Solicitation G15PS00227, 2015

USGS is interested in developing an environmental risk management program that has as its primary goal the assessment of risk from chemical, biological, and radioactive releases into the environment from USGS facilities and processes in sufficient quantities that could cause harm to the public and the environment. This notice is issued to conduct market research for planning purposes. USGS is investigating the availability of service providers who have the experience and expertise to implement a formal environmental risk management program, conduct on-site risk assessments, perform root cause analysis, and develop recommendations (including cost of mitigation) to correct conditions that if not mitigated, could result in releases of hazardous material/waste, including biological agents, into the environment. The agency has over 400 facilities located in 50 states and trust territories. The resultant contract is anticipated to be firm fixed price, covering one base year with a minimum of one option year. The NAICS code is 541620 and the size standard is $15M. There is no incumbent contractor. Brief capability statements are due by 11:00 AM ET, Tuesday, March 31, 2015. https://www.fedconnect.net/FedConnect/?doc=G15PS00227&agency=DOI

INNOVATIVE TECHNOLOGIES AND METHODS FOR IMPROVED RISK REDUCTION AT LEGACY SITES
Naval Facilities Engineering Command, NAVFAC EXWC Port Hueneme, CA.
Federal Business Opportunities, FBO-4856, Solicitation N3943015RITLS, 2015

The Naval Facilities Engineering and Expeditionary Warfare Center intends to solicit expert review from industry-leading subject matter experts who have a demonstrated background in the use of state-of-the-art and innovative techniques for treating contaminant-affected sites. The resultant contractor will review past history and current status at up to 38 sites across the United States and will submit findings and recommendations in a technical report on appropriate innovations and advancements in the environmental industry that would allow the Navy to achieve improved risk reduction at legacy impacted sites across the United States by treating soil and groundwater in a more timely and cost-effective fashion. The solicitation will be 100% set-aside for small business under NAICS code 541620, with a small business size of $15M. The Navy intends to award two firm-fixed-price contracts for this requirement, with a base period of eight months and one 6-month option period. The anticipated release date of the solicitation is on or about March 25, 2015, closing three weeks thereafter. https://www.fbo.gov/notices/a0e71aac11b9018c9d19eb7b6ec031fd

TECHNOLOGY TRANSFER OPPORTUNITY: WIRELESS CHEMICAL SENSOR
NASA Langley Research Center, Industry Assistance Office, Hampton, VA.
Federal Business Opportunities, FBO-4851, Solicitation TT-01107, 2015

NASA Langley Research Center solicits inquiries from companies interested in obtaining license rights to commercialize, manufacture, and market its new wireless chemical sensor technology. The wireless, open-circuit SansEC (i.e., without electrical connections) sensor can detect the presence of a chemical without being in contact with it. The sensor consists of a thin-film electrically conductive geometric pattern that stores energy in both electric and magnetic fields. When wirelessly interrogated using the NASA-developed Magnetic Field Response Recorder, the sensor becomes electrically active, and a chemical reactant works in tandem with the thin-film trace. The presence of a target chemical causes a change to the reactant that alters the sensor's magnetic field response attributes, which is noted electronically by the Magnetic Field Response Recorder. The elimination of all wires, connections, and electronic components enables cost-effective sensor production. To express interest in this commercialization opportunity, see the contact information in the notice at FedBizOpps (NASA Reference Number LAR-17579-1; U.S. patent 8,673,649).
https://www.fbo.gov/spg/NASA/LaRC/OPDC/20220/TT-01107/listing.html

Cleanup News

ELECTRICAL RESISTANCE HEATING OF VOLATILE ORGANIC COMPOUNDS IN SEDIMENTARY ROCK
Beyke, G.L., B.A. Hodges, and G.N. Jones.
Remediation Journal, Vol 25 No 1, 53-70, 2014

In the past eight years, electrical resistance heating (ERH) has been used successfully to treat 10 or more contaminated sedimentary bedrock sites. Sedimentary bedrock treatment has recently expanded to greater depths and into karst limestone environments. This article describes implementation issues for rock remediation and provides case studies of three ERH cleanup sites in Pennsylvania and Alabama.

GEOCHEMICAL PROCESSES IN A CONSTRUCTED WETLAND RECEIVING OUTFLOW FROM A SULFATE-REDUCING BIOREACTOR USED TO TREAT ACID MINE DRAINAGE
Nicholas, Mary, SPEA Undergraduate Honors Thesis, Indiana University, 23 pp, 2014

A sulfate-reducing bioreactor (SRB) was constructed at the abandoned Blackfoot mine site in Pike County, Indiana, to treat acid mine drainage having an average pH of 3 and concentrations of 3,200 mg/L sulfate, 90 mg/L Fe, and 130 mg/L Al. The SRB outflow averages pH 6.4 and shows a temperature increase of 6ºC relative to the inflow as well as 4 mg/L dissolved oxygen. The average outflow concentration of sulfate has been reduced to 2,500 mg/L, and the concentrations of both Fe and Al have decreased to 1 mg/L. The constructed wetland contributed to further treatment and equilibration of the discharging SRB water by increasing pH as high as 7.2 and dissolved oxygen to 9 mg/L, and further reducing sulfate concentration to 2,200 mg/L. https://spea.indiana.edu/doc/undergraduate/ugrd_thesis2014_eny_olyphant.pdf

VOGEL PAINT AND WAX COMPANY SUPERFUND SITE, SIOUX COUNTY, MAURICE, IOWA: FOURTH FIVE-YEAR REVIEW REPORT
U.S. EPA Region 7, Lenexa, KS. 148 pp, 2014

The Vogel plant in Orange City, Iowa, used the site in Maurice for disposal of paint sludge, resins, solvents and solid waste, which led to soil and groundwater contamination with zinc, lead, chromium, mercury, toluene, xylenes, naphtha, methyl ethyl ketone, and methyl isobutyl ketone. The state is the lead agency for the site. Soil excavation and bioremediation/landfarming was initiated in 1991 and completed in 1999. In 2000, soils with high lead levels were stabilized/solidified by adding and mixing agricultural lime until acceptable TCLP results were obtained. Installation of a currently operating bioventing system was completed in 2001. Groundwater pump and treat was operated 1992-2004 and since has been off line. Enhanced free product recovery was completed in December 2000. Vogel initiated a 1-acre phytoremediation pilot study in 2007 at the original source area and planted additional trees on 2.5 acres in 2008. The trees were observed to be in good health during the site visit. Contaminant concentrations in nearby monitoring wells generally have been stable during the five-year review period. The site currently relies on phytoremediation and natural attenuation to remediate and contain the contaminated groundwaterhttp://www.epa.gov/region07/cleanup/superfund/5year2014/4th-5year-review-vogel-paint-wax-co-sioux-county-maurice-ia.pdf

SYNERGISTIC WETLAND TREATMENT OF SEWAGE AND MINE WATER: POLLUTANT REMOVAL PERFORMANCE OF THE FIRST FULL-SCALE SYSTEM
Younger, P.L. and R. Henderson.
Water Research, Vol 55, 74-82, 2014

The first full-scale co-treatment wetland receiving large inflows of both partially treated sewage (~100 L/s) and mine water (~300 L/s) was commissioned in Gateshead, England, in 2005. Recent performance evaluation of the surface-flow aerobic system is based on water quality data routinely collected by the plant operator. The principal parameters of concern in the sewage effluent are suspended solids, BOD_5, ammoniacal nitrogen (NH_4-N), and phosphate (P); in the mine water the only parameter of particular concern is total iron (Fe). Aerobic treatment processes are appropriate for removal of BOD_5, NH_4-N, and Fe; for the removal of P, reaction with Fe to form ferric phosphate solids is a likely pathway. Analysis of sample concentration level and daily flow rate data revealed sustained, high rates of absolute removal of all pollutants from the combined wastewater flow, quantified in terms of differences between influent and effluent loadings (i.e., mass per unit time). In terms of annual mass retention rates, the wetland system sequesters the following percentages of the key pollutants: BOD_5 41%; Fe 89%; NH_4-N 66%; dissolved P 59%; total P 46%; and suspended solids 66%. http://eprints.gla.ac.uk/94243/1/94243.pdf

2014 REMEDIAL ACTION EFFECTIVENESS REPORT: WHIRLPOOL CORPORATION, FORT SMITH, ARKANSAS
Whirlpool Corporation, 195 pp, 2015

Whirlpool Corporation is employing an adaptive remedy approach to address TCE contamination in on-site soil and groundwater and in groundwater adjacent to its facility in Fort Smith, Arkansas. The Remedial Action Decision Document submitted to the Arkansas Department of Environmental Quality calls for institutional controls, soil cover, in situ chemical oxidation (ISCO), monitored natural attenuation, and performance monitoring. Three ISCO injection events conducted in 2014 achieved reductions in groundwater TCE plume concentrations of 50% or better. The ISCO techniques employed use base-activated sodium persulfate and sodium persulfate activated with modified Fenton's reagent (hydrogen peroxide and chelated iron). An interim corrective action measure in a possible source area was completed in October 2014 with the drilling of 19 large diameter borings along the Area 1 linear drainage feature to remove ~353 yd^3 of TCE-contaminated soils. The borings were completed to the top of shale and were backfilled with crushed limestone gravel to increase the naturally low groundwater pH. Fifty-five wells are monitored quarterly for natural attenuation parameters. *See this report, work plans, and monitoring reports for this cleanup at* http://whirlpoolfortsmith.com/ *and* http://whirlpoolfortsmith.com/background.html.

Demonstrations / Feasibility Studies

FIELD APPLICATION OF ELECTROKINETIC REMEDIATION FOR MULTI-METAL CONTAMINATED PADDY SOIL USING TWO-DIMENSIONAL ELECTRODE CONFIGURATION
Kim, W.S., E.K. Jeon, J.M. Jung, H.B. Jung, S.H. Ko, C.I. Seo, and K. Baek.
Environmental Science and Pollution Research, Vol 21 No 6, 4482-4491, 2014

The feasibility of in situ electrokinetic remediation for As-, Cu-, and Pb-contaminated soil was evaluated in a pilot-scale field application with 2-D electrode configurations. Square and hexagonal configurations with different electrode spacing, 1 m and 2 m, were investigated under a constant 100 V. A square configuration with electrode spacing of 2 m removed 61.5% As, 11.4% Cu, and 0.9% Pb, whereas a hexagonal configuration with the same spacing showed a higher removal efficiency in top (59% As, 0-0.5 m) and middle (53% As, 0.5-1.0 m) layers, but much lower removal efficiency in the bottom layer (1-1.5 m). This difference was thought to be due to groundwater flow through periodic rise and fall of tides. Fractionation analysis showed that As bound to Fe-Mn oxyhydroxide was the main form of As removed by the electrokinetic process. The 2-D configuration wasted less electrical energy by Joule heating and required fewer electrode installations compared to a 1-D electrode configuration.

IN SITU ELECTROKINETIC REMEDIATION OF AS-, CU-, AND PB-CONTAMINATED PADDY SOIL USING HEXAGONAL ELECTRODE CONFIGURATION: A FULL SCALE STUDY
Jeon, E.K., J.M. Jung, W.S. Kim, S.H. Ko, and K. Baek.
Environmental Science and Pollution Research, Vol 22 No 1, 711-720, 2015

The in situ applicability of the electrokinetic process in a hexagonal electrode configuration to remediate As-, Cu-, and Pb-contaminated paddy rice field soil was investigated at field scale (17 m width, 12.2 m length, and 1.6 m depth). An iron electrode was used to prevent severe acidification of the soil near the anode. EDTA was selected as a pursing electrolyte to enhance Cu and Pb extraction. The system removed 44.4% As, 40.3% Cu, and 46.6% Pb after 24 weeks of operation. Fractionation analysis showed that the As bound to amorphous Fe and Al oxyhydroxides was changed into a specifically bound form of As. The fraction of Cu and Pb bound to Fe-Mn oxyhydroxide primarily decreased. The EDTA formed negatively charged complexes with Cu and Pb, and those complexes were transported toward the anode. Energy consumption was very low due to Joule heating. Results show that in situ electrokinetic treatment can remove multiple metals from contaminated paddy rice fields.

EVALUATION OF ORGANIC AMENDMENTS IN A ZERO-VALENT IRON-ENHANCED PERMEABLE REACTIVE BARRIER TO TREAT METALS AND SULFATE IN WATER
Legrand, R., R.L. Henry, J.G. Bain, D.W. Blowes, J.F. Strunk, and Y. Chai.
Tailings and Mine Waste '14, 5-8 October, Keystone, Colorado. 30 slides, 2014

At a closed mining site where mining-influenced groundwater shows concentrations of 2,000 to 3,000 mg/L sulfate, metals (Cd, Cu, Ni, Zn), and pH < 5, a pilot-scale aboveground system has been installed to evaluate the optimum mixture of reactive material and residence time needed to enable a future permeable reactive barrier (PRB) to achieve cleanup goals by raising pH, reducing sulfate, and removing metals. The 300-gallon pilot plant has been operated for one year on site with site groundwater. The PRB mix comprises 45% (vol.) gravel, 10% zero-valent iron (ZVI), 5% limestone, 20% spent Brewer's grains, and 20% wood chips/leaf mulch soaked in vegetable oil. Influent is a constant 68°F (groundwater temperature). The system generally achieves sulfate removal of 99+% and removes metals to below the strictest water quality standards. High sulfate input can eventually oxidize any organic substrate, which will depress sulfate reduction; however, re-injecting vegetable oil can extend the longevity of the barrier. Results indicate that with a typical residence time of 12 days and a groundwater seepage velocity of 8 in/day, the full-scale PRB would have to be 8 ft wide.
http://www.infomine.com/library/publications/docs/Legrand2014.pdf

TREATMENT OF MINING SITE SEEPAGE WATER USING SULFATE REDUCING ORGANISMS
Borg, Sami Christian, Master's thesis, Tampere University of Technology, Finland. 66 pp, 2014

A pilot-scale biological permeable reactive barrier filled with 45% gravel for permeability, 45% electron donor mixture (one-third each silage, wood chips, and compost material), and 10% bacterial inoculum was installed for purification of seepage waters at the Siilinjaervi mining site in Finland. Seepage water containing sulfate (average concentration 124.8 mg/L) was pumped into the reactor for a hydraulic retention time of 15 days. The reactor was operated for three months, and influent and effluent quality was monitored twice each week. Complete removal of sulfate was obtained in the reactor when the temperature of the influent was at least 12°C, whereas ~50% of the sulfate was removed at 8°C and only ~25% at 5°C. The goal was two-thirds yearly sulfate removal, which was calculated to be achievable by increasing the retention time to 30 days. [Note:*Only a brief summary of this thesis is available in English.*]

Research

PHYTOREMEDIATION AND BIOREMEDIATION OF POLYCHLORINATED BIPHENYLS (PCBS): STATE OF KNOWLEDGE AND RESEARCH PERSPECTIVES
Passatore, L., S. Rossetti, A.A. Juwarkar, and A. Massacci.
Journal of Hazardous Materials, Vol 278, 189-202, 2014

This review summarizes bioremediation and phytoremediation technologies proposed so far to detoxify PCB-contaminated sites. A critical analysis of the potential and limits of PCB treatment strategies by plants, fungi, and bacteria includes new insights from recent studies on rhizosphere potential and the implementation of simultaneous aerobic and anaerobic biodegradation processes. The review elaborates on the environmental variables affecting contaminant degradation rates; summarizes the amendments recommended to enhance PCB degradation; and discusses issues connected with PCB toxicology, actual field remediation strategies, and economic evaluation.

ELECTROKINETIC-ENHANCED BIOREMEDIATION OF ORGANIC CONTAMINANTS: A REVIEW OF PROCESSES AND ENVIRONMENTAL APPLICATIONS
Gill, R.T., M.J. Harbottle, J.W.N. Smith, and S.F. Thornton.
Chemosphere, Vol 107, 31-42, 2014

This review focuses on the combination of electrokinetics and bioremediation to examine the state of knowledge on electrokinetic bioremediation (EK-bio) and evaluate factors that affect the scale-up of lab and bench-scale work to field-scale application. It discusses the mechanisms of EK-bio in the subsurface environment at different micro- and macroscales, the influence of environmental processes on EK phenomena, and the design options available for field-scale application. The

review also presents results from a modeling exercise to illustrate the effectiveness of EK on the supply of electron acceptors to a plume-scale scenario where these are limiting. Current research needs include analysis of EK-bio in more representative environmental settings, such as those in physically heterogeneous systems, to gain a greater understanding of the controlling mechanisms of both EK and biodegradation in those scenarios.
http://orca.cf.ac.uk/59045/1/Chemosphere%202014.pdf

MODEL APPLICATION FOR ACID MINE DRAINAGE TREATMENT PROCESSES
Noosai, N., V. Vijayan, and K. Kengskool.
International Journal of Energy and Environment, Vol 5 No 6, 693-700, 2014

This paper presents the utilization of the geochemical model PHREEQC to investigate and select a chemical treatment system for acid mine drainage (AMD) prior to discharge. Treatment processes commonly used for AMD include a settling pond, vertical flow pond, and caustic soda pond. The use of a geochemical model enhanced understanding of the changes in AMD chemistry (e.g., precipitation, reduction of metals) in each process and thus determination of the chemical requirements (i.e., calcium carbonate and sodium hydroxide) for each system's treatment efficiency. The process also can assist in treatment system design.http://www.iiee.ieefoundation.org/vol5/issue6/IJEE_06_v5n6.pdf

IN PLANTA PASSIVE SAMPLING DEVICES FOR ASSESSING SUBSURFACE CHLORINATED SOLVENTS
Shetty, M.K., M.A. Limmer, K. Waltermire, G.C. Morrison, and J.G. Burken.
Chemosphere, Vol 104, 149-154, 2014

Contaminant concentrations in trees have been used to delineate groundwater contaminant plumes (i.e., phytoscreening); however, variability in tree composition hinders accurate measurement of contaminant concentrations in planta, particularly for long-term monitoring. This study investigated five materials for suitability in passive in planta solid-phase samplers (SPSs) to be used as a surrogate tree core. The five materials—polydimethylsiloxane (PDMS); linear low-density polyethylene (LLDPE); low-density polyethylene; polyoxymethylene; and plasticized polyvinyl chloride—were examined with respect to material-air partitioning coefficients for chlorinated solvents, sampler equilibration time, and field suitability. The PDMS SPSs performed most effectively in planta by accurately measuring TCE and PCE concentrations while simultaneously incorporating simple operation and minimal impact.

PHYTOSCREENING AND PHYTOEXTRACTION OF HEAVY METALS AT DANISH POLLUTED SITES USING WILLOW AND POPLAR TREES
Algreen, M., S. Trapp, and A. Rein.
Environmental Science and Pollution Research, Vol 21 No 15, 8992-9001, 2014

A study was conducted to determine typical concentrations of heavy metals (HMs) in wood from willows and poplars to test the feasibility of phytoscreening and HM phytoextraction. Samples were taken from one strongly, one moderately, and one slightly HM-contaminated site and from three reference sites. Wood from both tree species had similar background concentrations at 0.5 mg/kg Cd, 1.6 mg/kg Cu, 0.3 mg/kg Ni, and 25 mg/kg Zn. Concentrations of Cr and Pb were below or close to detection limit. Concentrations in wood from the highly contaminated site were elevated significantly compared to references, particularly for willow. Results suggest that tree coring could be used successfully to identify HM-contaminated soil for Cd, Cu, Ni, Zn, and that willow trees perform better than poplars, except when screening for Ni. Phytoextraction of HMs was quantified from measured concentration in wood at the most polluted site. Extraction efficiencies were best for willows and Cd, but below 0.5% over 10 years and below 1‰ in 10 years for all other HMs. *See the* ***Open Access*** *button at* http://link.springer.com/article/10.1007%2Fs11356-013-2085-z *for the full text of this paper.*

PLANT UPTAKE OF ENVIRONMENTAL CONTAMINANTS: APPLICATIONS IN PHYTOSCREENING
Limmer, Matthew Alan, Ph.D. dissertation, Missouri University of Science and Technology, 161 pp, 2014

The use of plants as contaminant biosensors requires an understanding of their interactions with the environment. Meteorological variables result in fluctuating water and contaminant fluxes through plants, manifested by seasonal trends in contaminant concentrations in tree trunks. While the application of phytoscreening for chlorinated solvents has been successful, numerous other organic contaminants also may be candidates. Chemical properties such as hydrophobicity, molecular weight, and hydrogen bonding were shown to explain uptake of organic compounds by plants. Beyond organic compounds, potential exists for phytoscreening of inorganics, such as perchlorate, a soluble oxyanion readily available to plant roots. A greenhouse study showed proportional response of tree sap perchlorate concentrations to dosing solution perchlorate. At a field site, perchlorate in tree cores generally reflected areas of groundwater perchlorate contamination. Collectively, phytoscreening is a low-impact, sustainable approach to plume delineation viable for a wide range of environmental contaminants. http://scholarsmine.mst.edu/cgi/viewcontent.cgi?article=3337&context=doctoral_dissertations

OPERATING WINDOWS OF TWO IMPORTANT LOW INPUT TECHNOLOGIES FOR GREENING URBAN BROWNFIELDS
Jones, S., P. Bardos, P. Menger, P. Kidd, M. Mench, W. Friesl-Hanl, T. Hutchings, F. de Leij, R. Herzig, F. Siemers, and J. Giulianotti.
Holistic Management of Brownfield Regeneration (HOMBRE), Deliverable 5.4, 149 pp, 2014

Incorporation of biochar and other in situ stabilization agents into contaminated soil along with recycling of organic matter (e.g., agricultural wastes, sewage sludge, manure, crop residues, paper, cardboard and wood) are examples of two low-input technology groups for regenerating brownfields and supporting specific soil functionality and risk management on site, as well as providing wider environmental benefits, such as carbon sequestration. This report gives an overview of existing literature regarding these technologies and discusses their potential uses, advantages, and disadvantages in urban brownfield regeneration. Also discussed are the outcomes of several joint initiatives between HOMBRE and the Greenland project undertaken as investigations of biochar and recycled organic wastes for remediating copper-contaminated soils. http://www.zerobrownfields.eu/HombreTrainingGallery/HOMBRE_D5.4_final.pdf

ENVIRONMENTAL, SOCIAL, AND ECONOMIC BENEFITS OF BIOCHAR FOR LAND RECLAMATION PURPOSES IN NORTHERN SASKATCHEWAN
Petelina, E., D. Sanscartier, S. MacWilliam, and R. Ridsdale.
Proceedings of the 38th British Columbia Mine Reclamation Symposium, 13 pp, 2014

Four revegetation options were examined for mine site reclamation: natural restoration, revegetation with peat application, and revegetation with application of either commercially or locally produced biochar. The assessment methods included option screening by an expert panel, a stakeholder opinion survey, and quantitative assessment (i.e., screening life cycle assessment and life cycle costing analysis). Results suggest that biochar provides observable environmental benefits, and its on-site production can also provide social benefits and economic opportunities, although currently biochar production and application is expensive and associated with technical risks, which can undermine overall project success. Positive trends in biochar production, however, suggest that in the near future this material may serve as an affordable and technically reliable alternative to conventional soil amendments for land reclamation.
Paper: http://circle.ubc.ca/bitstream/handle/2429/51133/Petelina_E_et%20al_BC_Mine_2014.pdf
Slides: http://www.esaa-events.com/proceedings/remtech/2014/pdf/14-Petelina.pdf

General News

ATTENUATION PATHWAYS FOR MUNITIONS CONSTITUENTS IN SOILS AND GROUNDWATER
Rectanus, H., R. Darlington, K. Kucharzyk, and S. Moore.
TR-NAVFAC EXWC-EV-1503, 81 pp, 2015

This report summarizes recent research findings related to munitions constituent (MC) attenuation pathways in soil and groundwater and discusses lessons learned from monitored natural attenuation and bioremediation applications for MC at DoD sites. The report's scope includes MC issues; physical, chemical, and biological attenuation pathways; technology applications; and eight case studies.
https://www.navfac.navy.mil/content/dam/navfac/Specialty%20Centers/Engineering%20and%20Expeditionary%20Warfare%20Center/Environmental/Restoration/er_pdfs/a/navfacexwc-ev-tr-1503-attenpath-mc-201501f.pdf

THE REMEDIATION PENDULUM: REVISITING PHYSICAL REMEDIATION USING STATE-OF-THE-SCIENCE DESIGN PRINCIPLES
Suthersan, S., D. Nelson, S. Burnell, and J. Horst.
Groundwater Monitoring & Remediation, Vol 34 No 1, 30-34, 2014

Treatment technologies that rely on physical mechanisms to remove or stabilize environmental contaminants were once the remedies of choice for contaminated groundwater. These options included groundwater extraction and aboveground treatment systems, aquifer sparging and venting, and deep soil mixing to encapsulate and bind up source mass within the saturated zone. Techniques can fall out of favor if they are found to be costly, inefficient, or incapable of achieving a remedial end point in a timely manner owing to self-limiting rates of treatment. As a result, the remediation pendulum can swing toward other techniques (e.g., in situ biological and chemical treatments) that seemingly could promote more efficient remediation. Over a decade later, a renewed interest in undergoing resurgence within the remediation industry largely because of rapidly advancing understanding of remediation hydraulics and contaminant hydrodynamic principles. Remedies once viewed as costly and perpetual in nature now are being applied using modernized design concepts with highly effective results, leading to lower levels of long-term stewardship compared with traditional design and application methods of the past. The authors explore some lessons learned and the theoretical underpinnings related to the remediation technology trends and their drivers, along with exploration of a few technologies that embody the advancement of physical treatment techniques as an effective strategy for site closure. *This paper is* ***Open Access*** *at* http://onlinelibrary.wiley.com/doi/10.1111/gwmr.12041/pdf

HAZARDOUS WASTE: AGENCIES SHOULD TAKE STEPS TO IMPROVE INFORMATION ON USDA'S AND INTERIOR'S POTENTIALLY CONTAMINATED SITES
U.S. Government Accountability Office. GAO-15-35, 71 pp, 16 Jan 2015

USDA and Interior manage over 600 million acres of land, including sites contaminated from prior uses or events, such as mining or toxic spills. These lands are managed by five Interior agencies (e.g., BLM, National Park Service) and five USDA agencies (e.g., U.S. Forest Service). These agencies must identify and report to EPA certain facilities that may threaten human health or the environment and, under some circumstances, clean them up. They must also report cost estimates for addressing contamination at certain "environmental liability" sites. This report examines USDA's and Interior's (1) efforts to identify their potentially contaminated sites, (2) funding to address the sites, and (3) reported environmental liabilities, as well as EPA's role in addressing the sites. GAO reviewed relevant laws and government accounting standards; examined agencies' policies, site inventory data from September 2013 to July 2014, and financial statements; and interviewed EPA, Interior, and USDA officials. GAO recommends that USDA develop plans and procedures for completing its site inventories and that EPA clarify which USDA and Interior sites need an environmental assessment. Interior and EPA generally agreed. USDA disagreed that its incomplete inventory affects the effectiveness of its cleanup programs, but GAO continues to believe that effective program management requires reliable data.
http://www.gao.gov/products/GAO-15-35

A REVIEW OF GREEN AND SUSTAINABLE REMEDIATION (GSR) PRACTICES AT NAVFAC ENVIRONMENTAL RESTORATION SITES
Long, I. and D. Nair.
TM-NAVFAC EXWC-EV-1439, 213 pp, 2014

The objective of this white paper is to examine the use of GSR within the Navy's Environmental Restoration (ER) program, provide an overview of policies related to GSR evaluations from DoD and the U.S. Navy, and explain the significance of GSR in environmental remediation and the drivers behind its use. The review also covers best management practices (BMPs) and lessons learned from the application of GSR metrics at Navy and Marine Corps sites nationwide. From a total of 60 ER sites that have conducted a GSR evaluation and/or implemented GSR BMPs, project documentation was readily available for 32 of the sites to summarize detailed information on the site-specific GSR approach (see Appendix A). The information obtained then was used to identify and categorize BMPs and their potential impact on the remedy footprint and to track overall trends in the adoption of GSR practices across the Naval Facilities Engineering Command.
http://www.navfac.navy.mil/content/dam/navfac/Specialty%20Centers/Engineering%20and%20Expeditionary%20Warfare%20Center/Environmental/Restoration/er_pdfs/g/navfacexwc-ev-tm-1439-gsr-ersites-201406.pdf

NEXT GENERATION RISK ASSESSMENT: INCORPORATION OF RECENT ADVANCES IN MOLECULAR, COMPUTATIONAL, AND SYSTEMS BIOLOGY
U.S. EPA, National Center for Environmental Assessment.
EPA 600-R-14-004, 196 pp, 2014

This report describes new approaches that are faster, more robust, and less resource intensive for addressing the challenges of assessing potential human health hazards for chemicals introduced into the environment. New molecular, computational, and systems biology data and approaches (together called "NexGen") have the potential to better inform risk assessment. This report summarizes the state of the science and provides case studies that use available NexGen information. http://ofmpub.epa.gov/eims/eimscomm.getfile?p_download_id=520491

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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