Technology Innovation News Survey

Entries for November 16-30, 2014

Market/Commercialization Information

SPECIAL NOTICE: INDUSTRY FORUM FOR RADMAC II

Naval Facilities Engineering Command, NAVFAC Southwest, San Diego, CA.
Federal Business Opportunities, FBO-4785, Solicitation N6247315R0811, 2014

NAVFAC Southwest is preparing to release a solicitation for a firm-fixed-price, indefinite-delivery, indefinite-quantity, environmental multiple-award contract for Environmental Remediation of Radiological Contaminants (RADMAC II) at locations within the NAVFAC Southwest and Atlantic areas of responsibility. This competitive procurement will be solicited by full and open competition under NAICS code 562910. To advise firms interested in proposing on RADMAC II, an Industry Forum will be held in San Diego on January 20, 2015, prior to solicitation posting. Firms interested in attending the Industry Forum must register via email by January 12. Due to space limitations, firms will be allowed only two attendees. https://www.fbo.gov/spg/DON/NAVFAC/N68711A6A/N6247315R0811/listing.html

ARCHITECT-ENGINEER DESIGN IDIQ FOR ASBESTOS/HAZMAT ENGINEERING SERVICES AT VARIOUS LOCATIONS UNDER THE COGNIZANCE OF NAVFAC SOUTHEAST

Naval Facilities Engineering Command, NAVFAC Southeast, Jacksonville, FL.
Federal Business Opportunities, FBO-4772, Solicitation N6945015R0105, 2014

This procurement is a competitive 8(a) set-aside under NAICS code 541330. The scope of work is primarily third-party monitoring (air quality/radon) at various locations. Work may include studies to determine potential hazards at Naval installations due to the presence of asbestos-containing material (ACM), LBP, PCBs, mold, and other hazardous materials; recommendations concerning best workable solutions for abatement actions; preparation of plans and specifications for removal of the ACM, LBP, PCBs, mold, and other hazardous substances; and hazardous material information and compliance status. NAVFAC Southeast's geographic area of responsibility covers Alabama, Florida, Georgia, Louisiana, Mississippi, South Carolina, Texas, Bahamas (Andros Islands), Cuba (Guantanamo), and Puerto Rico. The contract will be a firm-fixed-price, IDIQ contract with a base period of 12 months and four one-year options, not to exceed five years or $5M. Completed SF 330s are due by 2:00 PM ET, January 23, 2015.
https://www.fbo.gov/notices/b86ff16a9e83c437f830c553b5b8f2c8

AFICA - JOINT BASE CHARLESTON PERFORMANCE BASED REMEDIATION (PBR) SOLICITATION REQUEST FOR PROPOSAL (RFP)

Air Force Installation Contracting Agency (AFICA), Joint Base Charleston, SC.
Federal Business Opportunities, FBO-4773, Solicitation FA8903-15-R-0006, 2014

This RFP is a total small business set-aside (NAICS code 562910) to fulfill requirements for a PBR approach for Installation Restoration Program and Military Munitions Response sites at Joint Base Charleston Air and Weapons, South Carolina. The statement of objectives is one of 18 files attached to the notice at FBO.gov. Award of a single, firm-fixed-price PBR contract between $10M and $25M with a 120-month period of performance for this effort is anticipated in the fourth quarter of FY15. Offers are due by or before 2:00 PM CT, February 5, 2015. https://www.fbo.gov/notices/60cbb55ba4ce616c24712558b64455e7

PERFORMANCE BASED ENVIRONMENTAL SECURITY TECHNOLOGY SERVICES (ESTS) MARKET SURVEY INFORMATION

Naval Facilities Engineering Command (NAVFAC), Port Hueneme, CA.
Federal Business Opportunities, FBO-4774, Solicitation N3943015RESTS, 2014

The Government is researching the contract types customarily utilized in the marketplace for environmental services as well as the availability of all types of small business offerors for these services. The Naval Facilities Engineering and Expeditionary Warfare Center requires a contract to provide environmental support to satisfy overall operational objectives of the U.S. Navy and Marine Corps installations, including engineering and incidental services for environmental program development and implementation, and research, development, testing, evaluation, and implementation of innovative environmental technologies and strategies. The applicable NAICS Code is 541330, with a size standard of $15M. Interested firms may submit comments and information by or before January 23, 2015.
https://www.fbo.gov/notices/aca178907230f8e34962417e4bc8e7f3

TREATMENT, CONTROL, AND MONITORING OF REMEDIATION TECHNOLOGIES

U.S. Environmental Protection Agency, Cincinnati, OH.
Federal Business Opportunities, FBO-4772, Solicitation SOL-CI-14-00019, 2014

EPA's Office of Research and Development has a need for technical and analytical services to support research, development, and evaluation studies. This requirement is expected to be set-aside for small business. The work include remediation processes and systems development, organism cultivation/rearing, contamination measurement and method development, GIS and modeling support, and research planning and presentation. Any future contract for these services likely will be a cost-plus-fixed-fee, level-of-effort type contract, comprising five one-year periods under NAICS code 541712, size standard of 500 employees. Details of the technical areas and requirements can be located through the search interface at https://www.fedconnect.net/. The solicitation will be issued through FedConnect no earlier than January 9, 2015. https://www.fbo.gov/spg/EPA/OAM/OH/SOL-CI-14-00019/listing.html

Cleanup News

RESULTS OF FIRST FULL SCALE 1,4-DIOXANE SYNTHETIC MEDIA GROUNDWATER REMEDIATION SYSTEM

Woodard, S., J. Berry, and C. Burkhardt.
RemTech 2014: Remediation Technologies Symposium 2014, 28 slides, 2014

This paper describes the objectives, design, implementation, and operation of the first full-scale synthetic media system (AMBERSORB™ 560) for 1,4-dioxane (dioxane) treatment at a site located in Waltham, Massachusetts. For groundwater containing ~20 µg/L dioxane and 3,000 µg/L chlorinated VOCs, the system was designed to treat 15 gpm as part of a larger, 100-gpm hydraulic control remedy. A modular system was designed to allow for future relocation and reuse. In the full-scale system, water is pumped up through multiple synthetic media vessels operated in series, i.e., lead-lag-polish operation. The dioxane and other contaminants preferentially adsorb to the media. Steam regeneration is performed in the vessel in down-flow mode. Influent dioxane concentrations ranged from 8-60 µg/L during the first 29 months of operation. Effluent concentrations were consistently non-detect, at **Slides:**
http://www.esaa-events.com/proceedings/remtech/2014/pdf/14-Woodard.pdf
Longer abstract: http://www.esaa-events.com/remtech2014/2014abstracts/Abstract%2058.pdf

NOT YOUR MOTHER'S MIXMASTER: IN-SITU REMEDIATION OF TETRACHLOROETHYLENE BY SOIL MIXING WITH ZERO VALENT IRON AND CLAY

Cicchini, S., D. Smyth, and M. Gray.
RemTech 2014: Remediation Technologies Symposium 2014, 26 slides, 2014

In the early '80s, a release of PCE occurred at the former Goodfish Lake Dry-Cleaning Plant. Full recovery of the PCE from the ground

surface and the adjacent municipal water treatment lagoon was not achieved. Characterization between 2008 and 2011 identified maximum PCE concentrations of 8,900 mg/kg in soil and 170 mg/L in groundwater within the lagoon footprint (to a depth of ~9 m bgs) and immediate surrounding area (~2-5 m bgs). The geology of the affected soil consisted of fractured silty clay overlying an upper weathered zone of clay shale bedrock. The remedial strategy included decommissioning of the lagoon and in situ mixing of contaminated soil with zero-valent iron and clay. In 2012, full-scale mixing of ~7,450 m^3 of soil was implemented through the advancement of 306 overlapping mixed columns (~2.4 m diameter) to depths between 5 and 9 m bgs. By early 2014, analytical results showed a 97% decrease of PCE concentrations in soil. Concentrations of PCE, DCE, and VC were stable or decreasing, while concentrations of cis-1,2-DCE varied. Groundwater elevations in surrounding wells indicated that shallow groundwater is flowing around the mix zone, with limited groundwater flow into and out of it.
Slides: http://www.esaa-events.com/proceedings/remtech/2014/pdf/14-Cicchini.pdf
Longer abstract: http://www.esaa-events.com/remtech2014/2014abstracts/Abstract%2049.pdf

FULL-SCALE IMPLEMENTATION OF IN-SITU CHEMICAL OXIDATION PERSULFATE INJECTION
Leu, J., J. Lin, M. Morales, and S. Ferris. IPEC 2014: 21st Annual International Petroleum Environmental Conference, 13-16 October 2014, Houston, Texas. 35 slides, 2014

For a site where TPH and BTEX contaminated the groundwater, treatment via persulfate injection was conducted using 12 direct-push injection boreholes, including six angled boreholes and four performance monitoring wells. Based on treatability study results, an average of 1,400 gallons of 10% sodium persulfate solution (33 g/L) was injected into each borehole at an average flow rate of 2.5 gpm. Geotechnical monitoring for settlement was conducted to ensure nearby residence integrity during the injection event. The existing 3-gpm groundwater extraction and treatment system was restarted three months after persulfate injection to capture TDS and sulfate detected in transition wells. Average GRO and DRO concentrations in the plume decreased from 3,500 and 3,700 µg/L to 170 and 1,400 µg/L, respectively, within six months.http://ipec.utulsa.edu/Conf2014/Full_Manuscripts_Presentations_Speech/Leau.pdf

AN IN SITU BIOREACTOR FOR TREATMENT OF GROUNDWATER IMPACTED BY PETROLEUM HYDROCARBONS
Sublette, K.L., E. Raes, and K.C. Clark. IPEC 2014: 21st Annual International Petroleum Environmental Conference, 13-16 October 2014, Houston, Texas. 31 slides, 2014

An in-well bioreactor can enhance natural attenuation processes by stimulating microbial growth that degrades contaminants. This particular approach builds on existing Bio-Sep™ bead technology, which currently is used commercially as a forensic tool for characterizing subsurface microbial ecology. Bio-Sep beads provide a substrate that can be colonized rapidly by active members of the microbial community, thus concentrating the indigenous degraders. Oxygen and nutrients also are delivered to the bioreactor to maintain conditions favorable for growth and reproduction. The contaminated groundwater is treated as it circulates through the bed of beads. Groundwater moving through the system also transports degraders released from beads away from the bioreactor, increasing biodegradation rates in the aquifer. An in-well bioreactor system was installed at the site of a fuel oil spill and operated continuously with monthly sampling events to monitor progress. The results of this case study are presented.
http://ipec.utulsa.edu/Conf2014/Full_Manuscripts_Presentations_Speech/Sublette_InSitu_Bioreactor.pdf

IN-SITU CHEMICAL OXIDATION: FROM PILOT STUDY TO FULL-SCALE IMPLEMENTATION
Lin, J., J. Leu, and M. Morales. IPEC 2014: 21st Annual International Petroleum Environmental Conference, 13-16 October 2014, Houston, Texas. 39 slides, 2014

An ozone sparge pilot study conducted to address TPH and BTEX concentrations in groundwater indicated 97% destruction of TPH and attenuation of by-products [Cr(VI) and bromate] to baseline concentrations after three months. The system sparged one well at a time sequentially. Pilot results indicated the optimum sparging interval to be 60 minutes per well to minimize off-gassing and maximize the radius of influence (20 ft). The full-scale ozone sparging system consisted of a 27-ppd ozone unit, six sparge wells, and eight performance monitoring wells. At a flow rate of 7 cfm and 20 psi pressure, the ozone unit sparged each well sequentially for 60 minutes. Two sparge wells were injected with oxygen instead of ozone to avoid corrosion of a nearby underground pipeline. An idle SVE unit with 12 in-Hg vacuum pressure and 1,000 cfm flow rate was restarted to collect VOC off-gas. After eight months of operation, concentrations of GRO (3,500 µg/L) and DRO (5,600 µg/L) declined to 160 and 2,400 µg/L, respectively.
http://ipec.utulsa.edu/Conf2014/Full_Manuscripts_Presentations_Speech/Lin.pdf

CONQUERING A BUSY INTERSECTION TO INSTALL HORIZONTAL REMEDIATION WELLS AND PROTECT INDOOR AIR
Sequino, M., IPEC 2014: 21st Annual International Petroleum Environmental Conference, 13-16 October 2014, Houston, Texas. 12 slides, 2014

A petroleum plume emanating from an automotive service shop at a street corner just half a block from the Governor's mansion in Tallahassee, Florida, migrated diagonally across the intersection, inhibiting access to the plume through vertical wells. The plume became wider downgradient as it crossed under the intersection, and curved pathways through multiple buried utility lines were needed for the directional-drilled horizontal well pairs to achieve plume coverage. Downhole sound-locating equipment with continuous calculation of wellbore depths and topographic survey points of the uneven ground surface was used for well placement. Four horizontal air sparge (AS) wells were placed along the top of a clay aquitard unit, with horizontal soil vapor extraction wells placed with the companion AS well for total vapor recovery. The most challenging aspect of the project—the resistance of commercial property owners across the intersection to allow excavation of exit pits in their front or back lawns—was overcome by installing blind horizontal wells constructed of 4-in HDPE without exit points at the far side of the intersection. System operation achieved 70% removal of BTEX and MTBE within 9 months.
http://ipec.utulsa.edu/Conf2014/Full_Manuscripts_Presentations_Speech/Sequino_Conquering.pdf

INTEGRATED APPROACH TO THE REMEDIATION OF CHLORINATED ORGANIC COMPOUNDS IN LOW PERMEABILITY SOILS: SIX YEARS POST INJECTION
Austrins, L.M. and J. West.
RemTech 2014: Remediation Technologies Symposium 2014, 27 slides, 2014

An integrated approach to in situ remediation of chlorinated solvents at a low permeability site introduced substrate to promote chemical degradation of free-phase compounds followed by substrate to enhance bioremediation of residual, diffuse contaminant concentrations. The two treatments were (1) direct dechlorination of the compounds through chemical reaction with zero-valent iron (both granular and emulsified ZVI), and (2) enhancing bioremediation through the addition of emulsified vegetable oil and glycol. Remediation efficacy in the silty clay was improved by hydraulic soil fracturing. Six-year post-injection results provide evidence for proof of concept using this integrated remedial approach, and field evidence indicates the methods employed are affecting contamination thought to be sorbed onto clay particles in the matrix, creating a remedial diffusion halo effect around the primary fractures.
Slides: http://www.esaa-events.com/proceedings/remtech/2014/pdf/14-Austrins1.pdf
Longer abstract: http://www.esaa-events.com/remtech2014/2014abstracts/Abstract%2039.pdf

FREE PRODUCT RECOVERY THROUGH HORIZONTAL WELLS
Collins, A., IPEC 2014: 21st Annual International Petroleum Environmental Conference, 13-16 October 2014, Houston, Texas. 32 slides, 2014

When the Marine Corps Air Station at Cherry Point, North Carolina, began environmental cleanup activities, a large plume of free product (aviation fuels) under the active aircraft maintenance building presented one of the more challenging projects. Maintenance building operations had to continue 24/7 without disruption. A system of horizontal wells was proposed to minimize disturbance to operations and maximize contact with the plume. The remedial design included three horizontal wells that intersected the plume through long screened intervals. Hydrophobic pumps were installed to pump free product to a treatment center adjacent to the building. The recovered product was pumped out periodically and recycled. The system was highly effective in removing free product and ultimately was recognized by DoD as a free product recovery system of the year.
http://ipec.utulsa.edu/Conf2014/Full_Manuscripts_Presentations_Speech/Collins.pdf

CONCEPTUAL REMEDIAL DESIGN PLAN: FORMER ROMIC ENVIRONMENTAL TECHNOLOGIES CORPORATION FACILITY, 2081 BAY ROAD, EAST PALO ALTO, CALIFORNIA

U.S. EPA Region 9, 91 pp, 2014

This site formerly served as a hazardous waste management facility for solvent recycling, fuel blending, wastewater treatment, and hazardous waste storage and treatment. VOCs (PCE, TCE, BTEX) have been detected at elevated concentrations in several site areas, and DNAPL is also believed to be present. The proposed treatment option to remediate VOC-impacted vadose zone soils calls for installation of horizontal injection wells, which will be connected to an in situ delivery (ISD™) groundwater recirculation system to deliver anaerobic substrates (i.e., CarBstrate™) to the subsurface to promote complete anaerobic dechlorination of chlorinated VOCs, followed by monitored natural attenuation of residual contamination. Once monitoring data show that chlorinated VOCs have reached an asymptotic state, EPA will be petitioned for approval to allow ISD system changeover to deliver aerobic substrates (EZT-A2™ consortium, PetroSolv™ surfactant, and CBN™ nutrient mix) to promote aerobic biodegradation of fuel-related compounds. An ISD groundwater recirculation system is also proposed to address VOC-impacted groundwater within the A-, B-, and C-zone aquifers beneath the site.
http://www.epa.gov/region9/waste/romic-eastpaloalto/pdf/romic-conceptual-remedial-design-plan-2014-02-05.pdf
Additional information: http://www.epa.gov/region9/waste/romic-eastpaloalto/

IMPLEMENTATION AND OPTIMIZATION OF AIR SPARGE/SOIL VAPOR EXTRACTION SYSTEM WITH HORIZONTAL AND VERTICAL WELLS

Rabideau, T.F., L.A. Sweet, D.R. Sopoci, and J.R. Neal. IPEC 2014: 21st Annual International Petroleum Environmental Conference, 13-16 October 2014, Houston, Texas. 32 slides, 2014

Impacts from a release into shallow soil and perched groundwater from underground storage tanks used to store solvents associated with former solvent-based paint processes at an active manufacturing facility were estimated to affect 0.43 acres of soil and 1.2 acres of groundwater, respectively. To address the soil and perched water impacts that extended beneath the facility, soil vapor extraction (SVE) and air sparging (AS) were selected for the remedial approach, and horizontal injection/extraction wells were designed to support remedial activities without interfering with facility operations. Data collected from AS and SVE pilot tests, performance monitoring, vapor samples, and perched water samples confirm the AS/SVE system will address remaining impacts and meet cleanup objectives.
http://ipec.utulsa.edu/Conf2014/Full_Manuscripts_Presentations_Speech/Rabideau_Kinter.pdf

Demonstrations / Feasibility Studies

BENZO(A)PYRENE AND TPH REMEDIATION COMPLETED BY IN SITU GAS THERMAL REMEDIATION

Kessel, L., C. Winell, G. Geckeler, and X. Chen.
RemTech 2014: Remediation Technologies Symposium 2014, 41 slides, 2014

Gas Thermal Remediation (GTR™) was used to remediate benzo[a]pyrene (B[a]P), benzene, naphthalene, TPH-diesel, and TPH-motor oil at a former manufactured gas plant, heating the soils in the target treatment zone (TTZ) to an average temperature of 325°C. The TTZ for this pilot study encompassed ~400 ft^2, extending from ground surface to ~15 ft bgs. To ensure target temperatures within the TTZ, heating wells were installed to 20 ft bgs for a total volume of about 333 yd^3 of silty sand, clay, and graded sand. Thermal activities were performed for about 4.5 months using 14 heating wells and 7 GTR heaters. One GTR heater heated two wells, and the second well applied reheated combustion air from the first. Extracted vapors were treated with GAC, and all condensed liquids were treated with an onsite liquid-phase GAC filtration system. During the active heating period of 130 days, ~1.78E+04 therms of natural gas and 6.39E+04 kWh of electricity were delivered to the treatment system. The system extracted and treated ~6.81E+06 ft^3 of off-gas and 1.64E+04 gal of liquid condensate. Original concentrations at the site were as high as 54.7 mg/kg (B[a]P equivalent value), with maximum TPH of 1,600 mg/kg diesel and 2,700 mg/kg motor oil. Confirmation sampling showed contaminant reduction >99.32% for B[a]P equivalent, 99.9% for naphthalene, and 100% for TPH. Thermal remediation was selected as part of the site-wide remedial action plan, and the pilot data will be used to optimize the full-scale treatment design.
Slides: http://www.esaa-events.com/proceedings/remtech/2014/pdf/14-Chen.pdf
Longer abstract: http://www.esaa-events.com/remtech2014/2014abstracts/Abstract%2010.pdf

SURFACTANT-ENHANCED PRODUCT RECOVERY (SEPR™) FOR CREOSOTE REMEDIATION

Socci, D., G. Dahal, and J. Holcomb. IPEC 2014: 21st Annual International Petroleum Environmental Conference, 13-16 October 2014, Houston, Texas. 34 slides, 2014

A pilot test of SEPR™ for remediation of creosote was conducted at a former wood treatment facility in Delaware, where creosote waste and condensate water had been released into an unlined lagoon. SEPR relies on the simultaneous injection of VeruSOL® (customized mixtures of plant-based surfactants and citrus extracts) and low concentrations of peroxide to emulsify DNAPL free product for subsequent extraction. Owing to the limited mobility of the highly viscous creosote oil, site investigations pre-treatment revealed extensive DNAPL impacts throughout the soil matrix, with minimal product accumulation in monitoring wells. During the pilot test, the chemical formulation of the surfactant and cosolvent mixture was customized to enhance its effectiveness at emulsifying and breaking apart the creosote oil into easily extractable globules. The pilot also examined the relationship of SEPR to a subsequent Surfactant-Enhanced In Situ Chemical Oxidation (S-ISCO®) polishing phase to determine the most efficient and effective treatment sequence.
Slides: http://ipec.utulsa.edu/Conf2014/Full_Manuscripts_Presentations_Speech/Socci_Surfactant_Enhanced_Product_Recovery.pdf
Longer abstract: http://www.verutek.com/Portals/65857/docs/Seaboard%20Lumber%20Case%20Study%20-%20Jan%202014.pdf

Research

REMEDIATION OF TCE CONTAMINATED GROUNDWATER USING PERMEABLE REACTIVE BARRIERS

Grajales-Mesa, S.J.
CL:AIRE (Contaminated Land: Applications in the Real Environments), AB-1, 4 pp, 2014

This bulletin describes lab studies conducted to evaluate reactive materials for treating contaminated groundwater in a permeable reactive barrier. The project focused on alternatives to zero-valent iron, such as compost and brown coal, to treat water contaminated with chlorinated solvents from a site located in southeast Poland near the town of Nowa Deba. In the lab, both compost and brown coal removed TCE successfully, with sorption of TCE to these materials playing a major role in contaminant removal.
http://theadvocateproject.eu/files/AB1_Johana.pdf

NEW METHODS TO ASSESS AND SUPPORT MONITORING NATURAL SOURCE ZONE DEPLETION

Goodwin, D., T. Palaia, E. Porter, A. Jimmo, and D. Bye.
RemTech 2014: Remediation Technologies Symposium 2014, 37 slides, 2014

Two new methods are available to monitor and assess natural attenuation of petroleum hydrocarbon LNAPL source zones, a process referred to as natural source zone depletion (NSZD). The methods—the LICOR soil flux system and E-Flux CO_2 traps—are derived from nearly a decade of university research and currently are being used to estimate NSZD on several sites in Canada. This presentation discusses the results of deployment of the new methods at a natural gas wellhead site in Alberta and provides practical information on use, costs, advantages, disadvantages, and application in estimating the NSZD rate at the site.
Slides: http://www.esaa-events.com/proceedings/remtech/2014/pdf/14-Goodwin.pdf
Longer abstract: http://www.esaa-events.com/remtech2014/2014abstracts/Abstract%2046.pdf

MEASURING VAPOR INTRUSION TO ESTIMATE UNDERGROUND CONTAMINATION

Superfund Research Program Research Brief 238, 2 pp, 2014

Scientists from the Brown University Superfund Research Program have taken a step toward providing a simpler accurate screening method to determine whether chemicals in underground sources are seeping into buildings and contaminating indoor air. The researchers developed 3-D process models, basically numerical equations, to predict the concentrations of vapors that enter indoor environments. Published in a series of three papers, results from the process models are consistent with advanced computer modeling techniques. Paper 1 describes a method that allows prediction of the sub-slab vapor concentration profile beneath a building's foundation for various source configurations, given inputs of building dimension and source depth. Paper 2 provides an additional equation that can be used to estimate concentrations of contaminants beneath a building from measurements performed at a distance, which is less intrusive to occupants. Paper 3 presents a model that can be used to identify buildings at risk for petroleum vapor intrusion and to estimate the distance from a petroleum contaminant source that needs to be screened, given a particular sub-slab concentration for a compound of concern. http://tools.niehs.nih.gov/srp/researchbriefs/view.cfm?Brief_ID=238

REMEDIATION OF WATER REPELLENT PETROLEUM CONTAMINATED SOIL FROM BEMIDJI, MINNESOTA BY ALKALINE DESORPTION
Adams, R.H., A. Cerecedo, and J.L. Nieber. IPEC 2014: 21st Annual International Petroleum Environmental Conference, 13-16 October 2014, Houston, Texas. 27 slides, 2014

Barren ground in a pipeline right-of-way contaminated with light crude in 1979 and subsequently burned shows TPH concentrations of 2,800-35,500 mg/kg, severe water repellency, and critical moisture 2-5 times above the in situ moisture content, but no toxicity. Loss of vegetation thus is attributed to water repellency rather than toxicity. Soil samples were treated with 0.1 N sodium hydroxide in two doses (1:3; soil:solution), drained completely between doses, washed with an equal volume or water, and again allowed to drain completely. Post-treatment, water repellency values in samples with initial 5.0-6.7 molarity of ethanol droplet (MED) had declined 94-100%. Samples with initial MED values in the range of 10-13 required more than one treatment. Site studies are underway to evaluate the performance of this treatment method as a stand-alone and as coupled with clay treatment.
http://ipec.utulsa.edu/Conf2014/Full_Manuscripts_Presentations_Speech/Adams.pdf

A QPCR ARRAY (QUANTARRAY) DEMONSTRATES ENHANCED BIODEGRADATION AT PETROLEUM IMPACTED SITES AND CONFIRMS THE IMPORTANCE OF RECENTLY ELUCIDATED PATHWAYS FOR ANAEROBIC HYDROCARBON BIODEGRADATION
Ogles, D., C. Brown, B. Baldwin, A. Biernacki, and K. Sublette. IPEC 2014: 21st Annual International Petroleum Environmental Conference, 13-16 October 2014, Houston, Texas. 42 slides, 2014

Even within a class of related contaminants, like BTEX, biodegradation can proceed by many different pathways, making comprehensive assessment of biodegradation potential more difficult. A new quantitative real-time polymerase chain reaction (qPCR) array (QuantArray™) can provide simultaneous quantification of a broad spectrum of functional gene targets in a single platform. For petroleum-impacted sites, QuantArray analysis includes not only functional genes for aerobic biodegradation of BTEX, PAHs, MTBE, and alkanes but also more divergent families of functional genes and the recently described carboxylases responsible for anaerobic biodegradation of benzene and naphthalene. This presentation describes results of QuantArrays used alongside traditional groundwater monitoring to evaluate natural attenuation, enhanced aerobic bioremediation, and enhanced anaerobic bioremediation (sulfate addition).
http://ipec.utulsa.edu/Conf2014/Full_Manuscripts_Presentations_Speech/Casey.pdf

CHARACTERIZATION OF NATURAL BIODEGRADATION USING BENZENE CARBON ISOTOPES AND GEOCHEMICAL LINES OF EVIDENCE
Ulrich, G. and P. Feshbach-Meriney. IPEC 2014: 21st Annual International Petroleum Environmental Conference, 13-16 October 2014, Houston, Texas. 22 slides, 2014

A monitored natural attenuation sampling program that included benzene carbon isotope analyses was used to evaluate the natural attenuation of petroleum hydrocarbons (including benzene) in shallow groundwater at a petroleum storage facility. Natural benzene biodegradation based on isotopically heavier carbon of benzene is in general associated with decreased benzene concentrations, increased electron acceptor concentrations, and decreased concentrations of biodegradation end products, including dissolved methane and ferrous iron. This typically is observed outside of areas containing LNAPL. Within the LNAPL areas, decreased electron acceptor concentrations (including sulfate) appear to reduce natural benzene biodegradation and attenuation.
http://ipec.utulsa.edu/Conf2014/Full_Manuscripts_Presentations_Speech/Ulrich.pdf

FIELD PERFORMANCE OF IN-SITU GEOCHEMICAL STABILIZATION FOR NON-AQUEOUS PHASE LIQUID TREATMENT
Karachalios, A., W. Meese, and S. Aluani. IPEC 2014: 21st Annual International Petroleum Environmental Conference, 13-16 October 2014, Houston, Texas. 18 slides, 2014

In situ geochemical stabilization (ISGS) technology entails the use of a modified permanganate solution that targets mass removal and flux reduction of NAPL contamination. Following introduction of the permanganate solution, the oxidant migrates through the treatment area and promotes geochemical reactions that destroy the targeted contaminants present in the dissolved phase. The NAPL then steadily loses its more labile components and "chemical weathering" or "hardening" occurs, with subsequent net increase in viscosity of the organic material, which yields a more stable, recalcitrant residual mass. Both the insoluble manganese dioxide precipitate (which results from permanganate oxidation) and other mineral species included in the ISGS formulation accumulate along the NAPL interface, physically coating the NAPL and thereby reducing the flux of dissolved-phase contaminants into the groundwater. ISGS was implemented in three sites (northern New Jersey, southeastern Pennsylvania, and northern Florida) to decrease source-area NAPL. Preliminary field results along with lab studies show the effects of the ISGS technology and offer insights on the treatment mechanisms.
http://ipec.utulsa.edu/Conf2014/Full_Manuscripts_Presentations_Speech/Mee.pdf

USING A HYBRID LCA METHOD TO EVALUATE THE SUSTAINABILITY OF SEDIMENT REMEDIATION AT THE LONDON OLYMPIC PARK
Hou, D., A. Al-Tabbaa, P. Guthrie, J. Hellings, and Q. Gu.
Journal of Cleaner Production, Vol 83, 87-95, 2014

Life cycle assessment (LCA) has been used increasingly by both researchers and industrial practitioners in the ongoing green and sustainable remediation movement. This paper proposes a new hybrid-LCA method. The proposed approach expands the LCA system boundary and reduces truncation errors; incorporates consequential benefits (i.e., tertiary impact) of remediation; and covers social, economic, and environmental impact. When the hybrid method was used to examine a sediment remediation project at the London Olympic Park site, the hybrid LCA was found to capture an additional 32% of secondary impact in soil washing and 8% of secondary impact in landfilling. The tertiary impact was found to be over twice the primary plus secondary impact in soil washing, and nearly 80% of the primary plus secondary impact in landfilling. The quantitative social and economic impact assessment results also provided useful information for holistic decision-making by balancing project costs with social and economic benefits.

General News

GASWORKS PROFILES
Thomas, R.
CL:AIRE (Contaminated Land: Applications in the Real Environments), ISBN: 978-1-905046-26-3, 111 pp, 2014

This document was developed to describe activities carried out on former manufactured gas plants (gasworks, or MGPs). This compilation offers four MGP profile sections: (A) The history and operation of MGPs in Britain, including process design, development, application, and associated waste/by-products; (B) Gasholders and their tanks, describing the construction and operation of different types of gasholders, associated tanks, and likely occurrence on former gasworks/gasholder sites; (C) Water gas plants, with description,

history, design, development, application, and associated contaminants; and (D) Producer gas plants, with description, design, development, application, and likely contaminants.
http://claire.co.uk/index.php?option=com_phocadownload&view=file&id=434&Itemid=230

ADVANCING SUSTAINABLE IN SITU REMEDIATION FOR CONTAMINATED LAND AND GROUNDWATER (ADVOCATE)

ADVOCATE Network Website, 2014

The practical implementation of sustainable in situ remediation in Europe and beyond is significantly underdeveloped. The ADVOCATE project aims to address this challenge via cross-disciplinary applied research that integrates the fundamental understanding of processes, performance assessment, engineering design, and cost-benefits that affect decision-making, management strategies, and technology applications for contaminated land and groundwater across different scales. The project's 18 academic and industry partners are coordinated by the University of Sheffield (UK). Learn more at the project website: http://www.theadvocateproject.eu/.

SOIL MIXING IN CONTAMINATED SOILS

Andromalos, K. and D. Ruffing.
Deep Foundations, 55-58, Mar/Apr 2014

"Soil mixing" commonly refers to any process by which reagents (wet or dry) are added to and mixed with unsuitable or contaminated soils. Contaminated soil mixing commonly is performed in situ using single-axis, large-diameter auger mixing with wet reagent addition. Large-diameter auger mixing in this application is performed by pumping a liquid reagent mixture down through a hollow drill stem into a large auger (auger diameters in the 3-12 ft range) where the fluid is allowed to exit the system via ports on the back of the auger and is mixed with the soils. The result is a soil column evenly mixed or treated with the reagent. Subsequent columns are installed in an overlapping pattern to confirm 100% coverage of the target treatment area. This paper provides a brief history of the technology and explains how soil mixing can be applied to in situ stabilization/solidification and in situ chemical treatment of contaminated soils.
http://www.geo-solutions.com/sites/default/files/Mar-Apr%202014%20DFI%20-%20Soil%20Mixing%20in%20Contaminated%20Soils.pdf

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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