Technology Innovation News Survey

Entries for July 1-15, 2017

Market/Commercialization Information

CONDUCT LTM AND WELL INSTALLATION AND REPAIR AT SITE SS005, AFP 59, NEW YORK

Department of the Air Force, AFICA - CONUS.
Federal Business Opportunities, FBO-5728, Solicitation FA8903-17-R-0067, 2017

This RFP is a total small business set-aside under NAICS code 562910. The purpose of this effort is to conduct long-term remediation monitoring of contamination that includes VOCs and 1,4-dioxane and to install and repair wells at Site SS005 at Air Force Plant 59, which is a Government-owned contractor-operated facility located in Johnson City, NY. The contractor shall sample, analyze, and test environmental media in accordance with an established planning document; install 2 new groundwater monitoring wells to replace previously abandoned wells; survey all wells to include vertical elevation; and develop new maps. The period of performance will be 8 months. The Government anticipates awarding a competitive firm-fixed-price contract. Funds are not presently available for this effort; hence award will be made when funds become available. Proposals must be received no later than 2:00 PM CT on August 29, 2017. https://www.fbo.gov/notices/7bbdbc72c7988dc0483d76739d98c226

ENVIRONMENTAL ENGINEERING SUPPORT SERVICES

National Aeronautics and Space Administration (NASA), Marshall Space Flight Center (MSFC).
Federal Business Opportunities, FBO-5728, Solicitation 80MSFC17C0014, 2017

This announcement constitutes a request for submittal of SF 330 packages to be used in preliminary screening of architect and engineering (A/E) firms for a future requirement. NASA/MSFC plans to issue an RFP under NAICS code 541330 for environmental engineering support services at the Marshall Space Flight Center in Huntsville, AL, and other NASA centers and installations. The A/E services will require the following disciplines: engineers with environmental compliance experience; professionals with experience in CERCLA or RCRA investigation/remediation; natural resources specialists; cultural resources specialists; chemists; risk assessors; community relations specialists; and hydrogeologists. Each firm must have past performance provided by its clients for up to 10 example projects (see Section F of SF 330) underway or completed within the last 10 years. Customer references must complete and return the questionnaire by 1:00 PM CT on August 28, 2017. SF 330s must be received by 3:00 PM CT on August 28, 2017. https://www.fbo.gov/notices/c4a24e2ae584cd893d4b8804ab8df281

REMEDIATION FOR WAIKOLOA MANEUVER AREA

U.S. Army Corps of Engineers, USACE HNC, Huntsville, AL.
Federal Business Opportunities, FBO-5727, Solicitation W912DY-17-R-0016, 2017

The objective of this firm-fixed-price competitive 8(a) stand-alone solicitation (NAICS code 562910) is to procure services to remove munitions and explosives of concern (MEC) and munitions potentially presenting an explosive hazard at multiple sites to meet the selected remedy requirements. Within the FUDS Waikoloa Maneuver Area located on the Island of Hawaii, areas B, O, Q and J-CLEARED - PROJECT 02 and Area P - PROJECT 22 are the primary focus. If right of entry cannot be obtained, clearance will be moved to another area within the former Waikoloa Maneuver Area and acreage will be negotiated based on terrain and land use. The contractor shall safely locate, identify, recover, evaluate, assess, package, transport, manage, and make final disposition of MEC and incidental hazardous, toxic and radioactive waste. The solicitation package is attached to the FedBizOpps announcement in a zipped file. Submit proposals via email by 12:00 noon CT on August 28, 2017. https://www.fbo.gov/spg/USA/COE/DACA87/W912DY-17-R-0016/listing.html

F--HANFORD 222-S LABORATORY SERVICES CONTRACT

U.S. Department of Energy, EM Consolidated Business Center, Cincinnati, OH.
Federal Business Opportunities, FBO-5726, Solicitation DE-SOL-0010519, 2017

Input is solicited from interested parties with the specialized capabilities needed to meet all or part of the requirements of the elements of scope for the upcoming competitive procurement for the Hanford 222-S Laboratory Contract. All types of small business entities are invited to respond to enable DOE to evaluate the potential for set-asides (NAICS code 562910, Remediation Services). DOE seeks feedback regarding options for innovative approaches for the performance of scope elements as well as insight into potential contracting alternatives to achieve the EM goals for the Hanford 222-S Laboratory contract. There is no performance work statement at this time, and the type of contract, period of performance, amount of funding, and set-aside possibilities are yet to be determined. DOE plans to provide a site tour on August 29 and to conduct a one-on-one information exchange session (45 minutes max) with each interested party on August 29 and 30. Firms desiring to participate in the tour, a one-on-one session, or both, may register to attend by 5:00 PM ET on August 21, 2017. Only U.S. citizens (no foreign nationals) are authorized to participate, and space is limited to two representatives per firm. DOE will respond with the specific date, time, and location for the tour and information exchange session. Submit capability statements via email no later than 5:00 PM ET on Thursday, September 21, 2017. To assist industry with statement preparation, information is provided at https://www.fedconnect.net/FedConnect/?doc=DE-SOL-0010519&agency=DOE and https://www.emcbc.doe.gov/SEB/222S_Lab/ .

CONDUCT RA-O AT SITE SS014 & CG022 AT LAUGHLIN AFB, TEXAS

Department of the Air Force, AFICA - CONUS, Laughlin AFB, Texas.
Federal Business Opportunities, FBO-5732, Solicitation FA8903-17-R-0053, 2017

This procurement is a total small business set-aside under NAICS code 562910. The contractor shall perform corrective action at Laughlin AFB in compliance with the Texas Risk Reduction Program to implement the remedy selected in the RAP Addendum for Site SS014D, the RAP for SS014 Sub-Areas A and B, and the RAP for CGO22. Site SS014 is an active petroleum fuel, oil, and lubricant offloading, storage, and dispensing facility. CG022 (AOC 20) refers to the undeveloped area around groundwater monitoring well SS014MW002, which is located ~400 ft northeast of closed IRP Site SS020, the Former Jet Engine Test Cell Facility. Requirements under this contract will primarily support environmental operations and services efforts. The period of performance will be 15 months. The Government anticipates awarding a competitive firm-fixed-price contract. Funds are not presently available for this effort, and no award will be made until funds are available. Proposals must be received no later than 2:00 PM CT on August 31, 2017. https://www.fbo.gov/notices/258be0d11cb4154794e98409c823b961

Cleanup News

VOLUNTARY REMEDIATION PROGRAM, STATUS REPORT #10: FORMER ESTECH GENERAL CHEMICAL SITE, ATLANTA, FULTON COUNTY, GEORGIA

Georgia Department of Natural Resources, 406 pp, 2017

The former Estech General Chemicals site is surrounded by the CSX Transportation Tilford Yard, which lies within the Inman Railyards. Impacts to the site soil and groundwater include organochlorine pesticides, As, Pb, and PAHs. A pilot test conducted January 2013 through April 2014 to evaluate the effectiveness of an EHC-M permeable reactive barrier (PRB) to address the groundwater contaminants showed limited success. The revised plan calls for a groundwater recirculating system to capture contaminated groundwater, treat the water in a limestone infiltration gallery by raising the pH, and allow the treated water to filter back into the subsurface, thus flushing contaminants in soil and groundwater toward the pumping-induced capture zone while raising the pH in subsurface soil and groundwater to reduce solubility and mobility of dissolved constituents (e.g., zinc). There is concern that groundwater extraction could pull the VOC groundwater plume from an adjacent site onto the downgradient Estech property; hence, implementation of the proposed pump-and-treat system is currently on hold pending further delineation of the groundwater VOC plume. In lab studies, limestone was batch-tested for treatment of metals and pesticides in site ground and surface water, while bioavailable adsorbent carbon media (BAM) was batch-tested for treatment of metals, pesticides, and VOCs in groundwater. BAM reduced metals concentrations (though to a lesser extent than the limestone); showed a greater percentage reduction in groundwater pesticide concentrations; and reduced VOC concentrations in groundwater. Combined use of the limestone and BAM appears to have applicability as a treatment process for the identified groundwater constituents. A surficial limestone PRB will be installed at the seep area and drainage feature near a stream on CSX property. https://epd.georgia.gov/sites/epd.georgia.gov/files/EstechAtlantaProgressRpt10.pdf

CHALLENGES OF SOIL MIXING USING CATALYZED HYDROGEN PEROXIDE WITH ROTATING DUAL AXIS BLENDING TECHNOLOGY

Kakarla, P., F. Symmes, M. Temple, V.D. Russo, E. Hall, W. Caldicott, and A. Hoffman
Remediation Journal 27(3):45-54(2017)

At the Kearsarge Metallurgical Superfund Site in New Hampshire, an enhanced catalyzed hydrogen peroxide (CHP) modified Fenton's reagent (MFR) was applied using an innovative rotating dual-axis blender to mix the MFR into low-plasticity silt and clay soils to remediate residual 1,1,1-TCA, 1,1-DCE, and 1,4-dioxane. The remediation program was designed to treat ~3,000 yd 3 of residual source area soil in situ by aggressively mixing in MFR from 7 to 15 ft bgs. The use of stabilizing agents along with careful calculation of the peroxide dose helped to ensure vapor-free conditions in the vicinity of the soil mixing operation. Post-treatment test results showed 1,1,1-TCA and 1,1-DCE concentrations at nondetect or below their cleanup goals of 150 µg/kg 1,1,1-TCA and 60 µg/kg 1,1-DCE, with these results verified at 6 and 12 months post-treatment. See details in the Remedial Action Completion Report at https://quicksilver.epa.gov/work/01/583592.pdf

Demonstrations / Feasibility Studies

TECHNICAL REPORT FOR THE DEMONSTRATION OF WIDE AREA RADIOLOGICAL DECONTAMINATION AND MITIGATION TECHNOLOGIES FOR BUILDING STRUCTURES AND VEHICLES

U.S. EPA, Office of Research and Development, National Homeland Security Research Center.
EPA 600-R-16-019, 78 pp, 2016

U.S. EPA in collaboration with the Department of Homeland Security conducted a wide-area urban radiological contaminant, mitigation, and cleanup technology demonstration in Columbus, Ohio, on June 22-25, 2015. Five wide-area radiological decontamination techniques, including strippable coatings, gels, and chemical foam technologies, were demonstrated on a 75-year-old brick urban building. Decontamination technologies were applied to remove contaminants from the building's surfaces by physical, chemical, or other methods, which in practice could reduce the radiation exposure level. In addition, several radiological contaminant mitigation technologies were demonstrated (e.g., building and vehicle wash technologies) as well as several approaches to contain wash water and radioactive particles. The purpose of the demonstrations was to educate potential end-users and stakeholders about options for radiological decontamination and contaminant mitigation. Multiple demonstrations were conducted using the brick building and the surrounding area, including parking lots. The objective was to duplicate and implement realistic operational conditions for the technologies without using radioactive contaminants. Example information was obtained for decontamination rate, contaminant mitigation and containment capacity, technology user friendliness, utilities required (electric, water) for each technology, required skill level of workers, and cost. https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=P100QYVC.txt

IMPACT OF ISCO TREATMENT ON PFAA CO-CONTAMINANTS AT A FORMER FIRE TRAINING AREA

Eberle, D., R. Ball, and T.B. Boving.
Environmental Science & Technology 51(9):5127-5136(2017)

Soil and groundwater samples were collected before and after an in situ chemical oxidation (ISCO) pilot-scale field test of a peroxone-activated persulfate (OxyZone) technology to evaluate the effects of ISCO aimed mainly at remediation of chlorinated VOC and perfluoroalkyl acid (PFAA) co-contaminants. Statistically significant decreases in PFAA groundwater concentrations were observed in post-treatment samples. Reductions in PFAA aqueous-phase concentrations were also supported by decreases in soil concentrations. No evidence was seen of increased aqueous PFAA concentrations due to mobilization from soil or from precursor conversion. As indicated by chloride data from inside and outside the treatment zone, displacement and dilution could not explain the observed decrease in PFAA concentration. The relatively constant pH values resulting from the use of a buffered oxidant solution did not support increased PFAA removal via soil sorption. Overall, the use of peroxone-activated persulfate to treat CVOCs had no discernible negative impacts on PFAA co-contaminants at the site; instead, the data suggest that PFAA

concentrations declined due to ISCO treatment.

ION EXCHANGE RESIN FOR PFAS REMOVAL AND PILOT TEST COMPARISON TO GAC

Woodard, S., J. Berry, and B. Newman.
Remediation Journal 27(3):19-27(2017)

Pilot-scale tests of ex situ treatment technologies for treatment of poly- and perfluorinated alkyl substances (PFASs) in groundwater compared ion-exchange resin to granular activated carbon (GAC) and evaluated in-place regeneration of the resin to restore PFAS removal capacity. Both resin and GAC removed PFOS and PFOA below U.S. EPA health advisories (HAs) of 0.070 µg/L combined. Compared at a common empty bed contact time (EBCT) of five minutes, the resin treated over eight times as many bed volumes (BVs) of groundwater as GAC before PFOS exceeded the EPA HA and six times as many BVs for PFOA. On a mass-to-mass basis, resin removed over four times as much total PFAS per gram as GAC before breakthrough was observed at the EPA HA. A solution of organic solvent and brine was used to regenerate the resin in the lead vessel, which had treated water up to the point of PFOS and PFOA breakthrough. The pilot test demonstrated successful in-place regeneration of the resin to near-virgin conditions. The regenerated resin then was used to treat the contaminated groundwater up to the same breakthrough point. PFAS removal results for the regenerated resin were consistent with virgin resin. **Presentation slides:**
http://www.azwater.org/resource/group/25c2bfe3-42d4-4cd3-9149-4911c841f6e5e/Downloads/2016-11-09_Webinar/AZAWWA_PFAS_IX_Removal.pdf

BIOSPARGING PILOT STUDY WORK PLAN, HARTLAND 36 GAS PLANT, HARTLAND TOWNSHIP, LIVINGSTON COUNTY, MICHIGAN

Hartland Township, Michigan. 20 pp, 2017

This document presents the procedures to be employed in the operation of a field-scale pilot study to evaluate the effectiveness of biosparging to enhance bioremediation of sulfolane dissolved in groundwater at the Hartland 36 Gas Plant. Sulfolane is expected to have very high mobility in soil, not to adsorb to suspended solids and sediment, and not to volatilize from dry soil surfaces given a vapor pressure of 0.0062 mm Hg. Results from microcosms constructed of groundwater and sediment obtained from natural gas plants suggest that sulfolane degrades readily under aerobic conditions (half-life of 2-3 days) but is stable under anaerobic conditions. The final objective of the pilot study is to utilize the data in a full-scale remediation system design.
http://hartlandtwp.com/wp-content/uploads/2014/01/Hartland-36-Biosparging-Pilot-Study-Work-Plan-4-05-2017.pdf

Research

A FIELD TRIAL OF TCE PHYTOREMEDIATION BY GENETICALLY MODIFIED POPLARS EXPRESSING CYTOCHROME P450 2E1

Legault, E.K., C.A. James, K. Stewart, I. Muiznieks, S.L. Doty, and S.E. Strand.
Environmental Science & Technology 51(11):6090-6099(2017)

In a controlled 6-yr field evaluation of the effectiveness of transgenic poplars for phytoremediation, three hydraulically contained test beds dosed with equivalent concentrations of TCE were planted with 12 transgenic poplars, 12 wild-type (WT) poplars, or left unplanted. TCE removal was enhanced in the transgenic tree bed, but not to the extent of removal observed in the lab. Total chlorinated ethene removal was 87% in the CYP2E1 bed, 85% in the WT bed, and 34% in the unplanted bed in 2012. Evapotranspiration of TCE from transgenic leaves declined by 80% and diffusion of TCE from transgenic stems fell by 90% compared to WT. Cis-DCE and VC levels decreased in the transgenic tree bed, and chloride ion accumulated in the planted beds corresponding to the TCE loss, suggesting that contaminant dehalogenation was the primary loss fate. *For additional information on this study, see E.K. Legault's thesis at* https://digital.lib.washington.edu/researchworks/handle/1773/22906.

CABLE BACTERIA AND THE BIOELECTROCHEMICAL SNORKEL: THE NATURAL AND ENGINEERED FACETS PLAYING A ROLE IN HYDROCARBONS DEGRADATION IN MARINE SEDIMENTS

Matturro, B., C.C. Viggi, F. Aulenta, and S. Rossetti.
Frontiers in Microbiology 8:952(2017) doi: 10.3389/fmicb.2017.00952

The Oil-Spill Snorkel is a novel bioelectrochemical approach to stimulate the oxidative biodegradation of petroleum hydrocarbons in sediments. The device consists of a single conductive material (the snorkel) positioned suitably to create an electrochemical connection between the anoxic zone (the contaminated sediment) and the oxic zone (the overlying O_2-containing water). The segment of the electrode buried within the sediment plays a role of anode, accepting electrons deriving from the oxidation of contaminants. Electrons flow through the snorkel up to the part exposed to the aerobic environment (the cathode), where they reduce oxygen to form water. This paper discusses the effect of the snorkel on key biogeochemical processes in oil-contaminated sediments. http://journal.frontiersin.org/article/10.3389/fmicb.2017.00952/full

CAPACITIVE DEIONIZATION OF ARSENIC-CONTAMINATED GROUNDWATER IN A SINGLE-PASS MODE

Fan, C.S., S.Y.H. Liou, and C.H. Hou.
Chemosphere 184:924-931(2017)

A single-pass-mode capacitive deionization (CDI) reactor was used to remove As from groundwater in the presence of multiple ions. The CDI reactor had an applied voltage of 1.2 V and six cell pairs of activated carbon electrodes, each 20 x 30 cm^2. The reactor achieved an As effluent concentration of 0.03 mg/L. The presence of other ions had a significant influence on As removal from groundwater. From an analysis of electrosorption selectivity, anion removal preference could be ordered as NO_3^- > SO_4^{2-} > F^- > Cl^- > As. The electrosorption selectivity for cations could be ordered as Ca^{2+} > Mg^{2+} > Na^+ ~ K^+. Monovalent cations could be replaced by divalent cations at the electrode surface in the later period of the electrosorption stage.

REMEDIATION OF OIL-BASED DRILL CUTTINGS USING LOW-TEMPERATURE THERMAL DESORPTION

Liu, Huan, Master's thesis, University of Northern British Columbia, 98 pp, 2017

Effective removal of petroleum hydrocarbons (PHCs) from oil-based drill cuttings (OBDCs) using low-temperature thermal desorption (LTTD) treatment achieved relatively complete PHCs removal and maximized soil health. When a bench-scale apparatus was used for LTTD treatment of OBDCs at different PHCs content, only traces of PHCs remained in the high-oil-content drill cuttings after LTTD at 300°C for 20 min. LTTD of OBDCs was shown to follow nonlinear least-squares exponential kinetics (adjusted R2 > 0.9), and under optimal operating conditions could achieve Canadian management limits at very low cost. These results may be used for designing effective LTTD treatment systems for OBDCs.
http://unbc.arcabc.ca/islandora/object/unbc%3A17344/datastream/PDF/download/citation.pdf

THE ROLE OF GEOLOGICAL STRUCTURE AND WEATHERING IN CONTAMINANT FATE AND TRANSPORT IN FRACTURED BEDROCK AT TWO SITES IN THE UK

Leahy, K., J. Baldock, and K. Johnson.
Quarterly Journal of Engineering Geology and Hydrogeology 50:287-300(2017)

At two superficially similar fractured bedrock sites in the UK affected by chlorinated solvents, site investigations used high-resolution site characterization techniques that allowed a detailed understanding of contaminant mass distribution in the source areas and development of advanced conceptual site models at both sites. Differences in the amount of weathering, the geological structural style, and the amount of organic C present meant that contaminant fate and transport is completely different at each site. Deep, pervasive weathering increased matrix porosity and permeability at the first site, while clay-infilled fractures in the underlying fresh shale prevented the contaminants from entering fractures at depth and produced a shallow and relatively short plume. At the second site very thin soils overlie a low-grade slate with almost no weathering, and solvent penetrated to greater depths and diffused into the matrix. A lack of pore space, carbon, and biodegradation produced a deep, long, fast-moving and highly concentrated plume that affects a nearby surface water receptor. The decision to obtain high-resolution structural logging and chemical sampling data was the most important choice in the development of the conceptual site model.

AN OVERVIEW OF GEOPHYSICAL TECHNOLOGIES APPROPRIATE FOR CHARACTERIZATION AND MONITORING AT FRACTURED-ROCK SITES

Day-Lewis, F.D., Slater, L.D., Robinson, J., Johnson, C., Terry, N., Werkema, D.,
Journal of Environmental Management [Published online 20 April 2017 prior to print]

Despite the potential of geophysical methods to "see" between boreholes, several issues have impeded the adoption of geophysical methods by remediation professionals. First, geophysical results are commonly related only indirectly to the properties of interest (e.g., permeability) to remediation professionals, and qualitative or quantitative interpretation is required to convert geophysical results to hydrogeologic information. Based upon the site remediation literature, additional demonstration/evaluation projects are needed to fully transfer geophysical methods from research to practice. Second, geophysical methods are commonly viewed as inherently risky by remediation professionals. Although it is widely understood that a given method may or may not work at a particular site, the reasons are not always clear to end users of geophysical products. Synthetic modeling tools are used in research to assess the potential of a particular method to successfully image a target, but these tools are not widely used in industry. To advance the application of geophysical methods to solve problems facing remediation professionals with respect to fractured-rock aquifers, this paper (1) provides an overview of geophysical methods applied to characterization and monitoring of fractured-rock aquifers; (2) reviews case studies showcasing different geophysical methods; and (3) discusses best practices for method selection and rejection based on synthetic modeling and decision support tools. *See additional information on this study at* https://www.serdp-estcp.org/Program-Areas/Environmental-Restoration/ER-201567-T2.

NATURAL ATTENUATION OF FATTY ACID METHYL ESTERS (FAME) IN SOIL AND GROUNDWATER

Thomas, A.O., M.C. Leahy, J.W.N. Smith, and M.J. Spence.
Quarterly Journal of Engineering Geology and Hydrogeology 50:301-317(2017)

Fatty acid methyl esters (FAME), increasingly used in biodiesel, are a group of organic compounds that can be synthesized through the process of esterification of fatty acids with methanol. Single FAME compounds are low in aqueous solubility, volatility, and mobility, but the mechanisms of autoxidation and hydrolysis may result in the generation of more mobile but equally biodegradable components. The FAME types found in the peer-reviewed literature do not appear to enhance the solubility of hydrocarbons but are widely reported to be readily biodegradable at varying rates under both aerobic and anaerobic conditions. In most studies, biodiesel FAME biodegradation occurred more rapidly than petroleum diesel biodegradation. At sites with limited electron acceptors and macronutrients, microorganisms that degrade FAME have the potential to deplete available electron acceptors and nutrients, resulting in an extended time for diesel biodegradation. As with other labile biofuels, anaerobic biodegradation of FAME can result in significant methane generation. Overall, natural attenuation would appear to be significant in controlling the fate, behavior, and potential risks posed by biodiesel. *This paper is* ***Open Access*** *at* http://qjegh.geoscienceworld.org/content/early/2017/05/31/qjegh2016-130.

THE ROLE OF NITRITE IN SULFATE RADICAL-BASED DEGRADATION OF PHENOLIC COMPOUNDS: AN UNEXPECTED NITRATION PROCESS RELEVANT TO GROUNDWATER REMEDIATION BY IN SITU CHEMICAL OXIDATION (ISCO)

Ji, Y., L. Wang, M. Jiang, J. Lu, C. Ferronato, and J.M. Chovelon.
Water Research 123:249-257(2017)

Thermally activated persulfate oxidation of phenol in the presence of nitrite, an anion widely present in natural waters, could lead to the formation of nitrated by-products, including 2-nitrophenol, 4-nitrophenol, 2,4-dinitrophenol, and 2,6-dinitrophenol. The involvement of nitrogen dioxide radical arising from sulfate-radical scavenging by nitrite was proposed in the formation of nitrophenols as a nitrating agent. It was observed that nitrophenols accounted for ~70% of the phenol transformed under reaction conditions of nitrite = 200 µM, [PS] = 2 mM, and temperature of 50°C. Increasing the concentration of nitrite markedly enhanced nitrophenols formation but did not greatly affect the phenol transformation rate. Phenol degradation and nitrophenols formation were significantly influenced by persulfate dosage, solution pH, and natural organic matter. Further studies on the degradation of other phenolic compounds, including 4-chlorophenol, 4-hydroxybenzoic acid, and acetaminophen, verified the formation of their corresponding nitrated by-products as well. Formation of nitrated by-products likely is a common but overlooked phenomenon during sulfate-radical-based oxidation of phenolic compounds in the presence of nitrite. Nitroaromatic compounds are well known for their carcinogenicity, mutagenicity, and genotoxicity; therefore, the potential for formation of nitrated organic by-products during ISCO merits careful evaluation.

HEAVY HYDROCARBON FATE AND TRANSPORT IN THE ENVIRONMENT

Brown, D.M., M. Bonte, R. Gill, J. Dawick, and P.J. Boogaard.

Quarterly Journal of Engineering Geology and Hydrogeology 50:333-346(2017)

Heavy hydrocarbons are a heterogeneous mixture of compounds consisting mainly of alkylated cyclics, resins, and asphaltenes; depending on the source, these can form a significant proportion of crude oil. Heavy hydrocarbons can be overlooked when assessing the risk of hydrocarbons to human health, ecology, and water reserves because their human and environmental health risks often are considered low; however, heavy hydrocarbons are known to persist in the environment. This review considers the fate, transport, and toxicity of heavy hydrocarbons; provides a description of the possible mechanisms involved in heavy hydrocarbon attenuation; and offers interpretation of data that provide insight into their persistence in the environment. *This paper is* ***Open Access*** *at* http://qjegh.geoscienceworld.org/content/early/2017/05/31/qjegh2016-142.

REAL-WORLD UNCERTAINTIES DURING A SITE ASSESSMENT OF VAPOUR MIGRATION INTO A RESIDENTIAL HOUSE FROM SOIL AND GROUNDWATER

Parker, T., H. White, G. Taylor, F. Evans, and M. Pearce.
Quarterly Journal of Engineering Geology and Hydrogeology 50:318-332(2017)

At a UK site containing an uninhabited house adjacent to soil and groundwater source zones, hydrocarbon concentrations within shallow groundwater, soil, soil vapor, and indoor air were measured over several sampling events, and biodegradation potential was assessed using biotraps. Recent publications and the site's data suggest that models are conservative and may overestimate potential indoor air concentrations. Attenuation from the subsurface into the house may be less than predicted if preferential pathways exist, but preferential pathways limit modeling applicability. As always, a robust and full understanding of the conceptual model is critical. At this site and most real-world sites, this understanding is often prohibitively expensive to obtain; notwithstanding this caveat, results at the study site suggest that both modeling algorithms and source-separation distance approaches are valid screening tools in the UK, provided that a robust understanding of the conceptual model is developed. *This paper is* ***Open Access*** *at* http://qjegh.geoscienceworld.org/content/early/2017/02/06/qjegh2016-129.

COMBINING GEOELECTRICAL MEASUREMENTS AND CO_2 ANALYSES TO MONITOR THE ENHANCED BIOREMEDIATION OF HYDROCARBON-CONTAMINATED SOILS: A FIELD IMPLEMENTATION

Noel, C., J.-C. Gourry, J. Deparis, M. Blessing, I. Ignatiadis, and C. Guimbaud.
Applied and Environmental Soil Science Article 1480976(2016)

Hydrocarbon-contaminated aquifers can be successfully remediated through enhanced biodegradation. As an alternative to in situ monitoring of the treatment by piezometers, geophysical methods of electrical resistivity (ER) and induced polarization (IP) were combined with gas analyses using CO_2 concentration and its carbon isotopic ratio to develop a less invasive methodology for monitoring hydrocarbon biodegradation. Field implementation of the monitoring methodology was carried out from February 2014 to June 2015 at a BTEX-contaminated site undergoing aerobic biotreatment. Geophysical monitoring showed a more conductive and chargeable area that corresponded to the contaminated zone. High CO_2 emissions measured with an isotopic signature demonstrated that biodegradation of hydrocarbon fuels was the main source of CO_2 on the site. The evolution of geochemical and geophysical data over a year suggested seasonal variation of bacterial activity. https://core.ac.uk/download/pdf/52712023.pdf

THE APPLICATION OF RADON FOR MAPPING OPEN FRACTURE NETWORKS IN A THIN VADOSE ZONE

McLing, T.L., W. Brandon, B. Zavala, R.W. Smith, C. Smith, T. Armstrong, and M. Carpenter.
Vadose Zone Journal 16(7):(2017)

A study conducted at Shepley's Hill, a highly fractured granite highland at the former Fort Devens military base, evaluated the applicability of using inexpensive, readily available passive Rn detectors to identify fractures and fracture networks in fracture-dominated vadose zones. Study results showed a clear spatial correlation of elevated ^{222}Rn concentrations emanating from fracture zones previously identified by independent geologic studies. At Shepley's Hill, the ^{222}Rn concentrations measured from detector locations directly above bedrock fractures located within the Disc Golf Fracture Zone were almost exclusively the highest values measured in the study, whereas probes above areas of less fractured bedrock and the Nona-Shep Fracture Zone showed relatively low ^{222}Rn concentrations. These two observations provide strong supporting evidence that not all fractures are equal when it comes to their ability to transmit gas and, by inference, water into and out of the subsurface. *See also an earlier paper on this study*: https://digital.library.unt.edu/ark:/67531/metadc827992/m2/1/high_res_d/1070114.pdf

General News

USE AND POTENTIAL IMPACTS OF AFFF CONTAINING PFASs AT AIRPORTS

Thalheimer, A.H., L.B. McConney, I.K. Kalinovich, A.V. Pigott, J.D. Franz, H.T. Holbert, et al.
National Academies Press, Washington, DC. ACRP Research Report 173, 230 pp, 2017

This report features a primer on PFASs that summarizes their composition, structure, and sources, as well as potential environmental and toxicological concerns about PFASs, regulatory issues, and how PFAS presence may affect an airport. The report also provides a discussion of AFFF management in an airport setting and recommended practices to investigate legacy environmental impacts, potential risks, and remediation options. To help airports identify areas of potential environmental concern, a research team developed the Managing AFFF and PFASs at Airports (MAPA) Screening Tool, which provides results for the airport as a whole and for individual areas of potential concern. The tool can also be used to foster collaboration among functional departments responsible for AFFF management, assessment of PFAS contamination, and remediation. *Visit* http://www.trb.org/main/blurbs/175866.aspx *to access the tool. The report is posted at* http://www.oregon.gov/osp/SFM/docs/Codes/Codes_OFCC/Use%20and%20Potential%20Impacts%20of%20AFFF%20Containing%20PFASs%20at%20Airports.pdf.

PROTOCOL FOR THE SAMPLING OF WATER AS A CORE MATRIX IN THE UNEP/GEF GMP2 PROJECTS FOR THE ANALYSIS OF PFOS, COMPONENT 2: ABIOTIC SAMPLES

UNEP (United Nations Environment Programme), 14 pp, 2017

This document provides practical information in the form of a standard operating procedure for active water sampling for subsequent PFOS analysis.
http://wedocs.unep.org/bitstream/handle/20.500.11822/21022/SOP%20Water%20Sampling%202017%20En.pdf?sequence=1&isAllowed=y.

CURRENT AND EMERGING POST-FUKUSHIMA TECHNOLOGIES, AND TECHNIQUES, AND PRACTICES FOR WIDE AREA RADIOLOGICAL SURVEY, REMEDIATION, AND WASTE MANAGEMENT

U.S. EPA, Office of Research and Development, National Homeland Security Research Center.
EPA 600-R-16-140, 69 pp, 2016

The potential of the technologies and techniques presented in this report are discussed in the event their deployment is required in response to a wide-area contamination event in the United States. In some cases, additional research and testing is needed for adequate validation of the effectiveness of the technology over wide areas. Survey techniques can be deployed on the ground or from the air, allowing a range of coverage rates and sensitivities. Survey technologies also include those useful in measuring decontamination progress and mapping contamination. Decontamination technologies and techniques range from non-destructive (e.g., high pressure washing) and minimally destructive (plowing) to fully destructive (surface removal or demolition). Waste minimization techniques can greatly affect the long-term environmental consequences and cost of remediation efforts. Recommendations on technical improvements to address technology gaps are presented together with observations on remediation in Japan. https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=P100RBHA.txt

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.

Mention of non-EPA documents, presentations, or papers does not constitute a U.S. EPA endorsement of their contents, only an acknowledgment that they exist and may be relevant to the Technology Innovation News Survey audience.