Technology Innovation News Survey

Entries for February 16-29, 2016

Market/Commercialization Information

FORMER SUNFLOWER ARMY AMMUNITION PLANT: EXPLOSIVE DECONTAMINATION AND REMOVAL OF OUTSIDE SEWER LINES

U.S. Army Corps of Engineers, USACE District, Kansas City, Missouri.
Federal Business Opportunities, FBO-5129, Solicitation W912DQ-16-R-3007, 2016

This solicitation will be set aside for eligible small business concerns registered under NAICS 562910, Environmental Remediation Services. As a result of activities at Sunflower over many years, sewer lines connecting various Solid Waste Management Units and Areas of Concern have been affected by explosives. Remediation services will include the removal and decontamination of potentially explosive sewers, including investigation and cleanup of environmental contamination beneath the sewers after any explosive hazards have been removed and the soil has been certified Material Documented as Safe. The magnitude of this construction contract is estimated between $25M and $100M. The solicitation will be issued on or after April 1, 2016.
https://www.fbo.gov/spg/USA/COE/DACA41/W912DQ-16-R-3007/listing.html

SERVICES IN SUPPORT OF HAZARDOUS TOXIC AND RADIOACTIVE WASTE INVESTIGATIONS AND ENVIRONMENTAL REMEDIATION PROGRAMS AND PROJECTS

U.S. Army Corps of Engineers, USACE District St. Louis, Missouri.
Federal Business Opportunities, FBO-5115, Solicitation W912P9-16-R-0007, 2016

The U.S. Army Corps of Engineers plans to solicit services in support of hazardous, toxic and radioactive waste investigations and remediation of environmental programs and projects managed by the USACE St. Louis District for sites located in the metropolitan St. Louis area, the Iowa Army Ammunition Plant in Burlington, and other sites assigned to the St. Louis District. The services to be provided generally include remedial investigation, remedial design, and remedial action for low-level radioactive contaminated material. Experience with lab data interpretation and reporting and the *Multi-Agency Radiation Survey and Site Investigation Manual* is required. Release of the solicitation is anticipated on or about April 4, 2016.
https://www.fbo.gov/notices/c1cfe2609864a2babffabedcbff4b859

ENVIRONMENTAL REMEDIATION SERVICES WITH MILITARY MUNITIONS RESPONSE PROGRAM: IDIQ MULTIPLE AWARD TASK ORDER CONTRACT

Department of the Army, U.S. Army Corps of Engineers, USACE District, Omaha, Nebraska.
Federal Business Opportunities, FBO-5128, Solicitations W9128F-16-R-0027 & W9128F-16-R-0028, 2016

As a part of the USACE Multiple Environmental Government Acquisition (MEGA) strategy, the Omaha District intends to issue an RFP on or about March 31, 2016, under NAICS code 562910 for Environmental Remediation Services (ERS) contracts, which will support work for USACE Northwestern Division and Omaha District existing customers using firm-fixed-price task orders. Solicitation W9128F-16-R-0027 will be issued as a competitive 8(a) small business set-aside, and Solicitation W9128F-16-R-0028 will be issued as a service-disabled, veteran-owned small business (SDVOSB) set-aside. Proposals likely will be due on or about April 29, 2016. Up to 10 MATOC awards will result from each solicitation. Each contract awarded under the MATOCs will have a base period of three years and a two-year option period. Evaluation of proposals will be performed on a best value trade-off basis. All of the solicitation documents will be posted to FedBizOpps.
Solicitation W9128F-16-R-0027 — 8(a) small business set-aside:
https://www.fbo.gov/spg/USA/COE/DACA45/W9128F-16-R-0027/listing.html
Solicitation W9128F-16-R-0028 — Service-disabled, veteran-owned small business set-aside:
https://www.fbo.gov/spg/USA/COE/DACA45/W9128F-16-R-0028/listing.html

MOLECULAR ANALYZER FOR EFFICIENT GAS-PHASE LOW-POWER INTERROGATION (MAEGLIN)

Office of the Director of National Intelligence, IARPA1, Washington, DC.
Federal Business Opportunities, FBO-5124, Solicitation IARPA-BAA-16-01, 2016

The MAEGLIN program aims to develop an ultra-low-power chemical analysis system for remote site detection and identification of explosives, chemical weapons, industrial toxins and pollutants, narcotics, and nuclear materials in the presence of significant background and interferents. Program goals include definitive chemical identification of species with an atomic mass https://www.fbo.gov/notices/29b985757158694e56e59801c3456922

SMALL BUSINESS EVENT: EPA REGION 6 INDUSTRY DAY

U.S. Environmental Protection Agency, Office of Small Business Programs.
Federal Business Opportunities, FBO-5138, Solicitation R6_INDUSTRYDAY2016, 2016

Interested parties are invited to register to attend U.S. EPA's Region 6 Industry Day for small firms seeking to do business with the Agency. The half-day outreach event is scheduled for Thursday, May 19, 2016, from 9:00 AM until noon in the 12th Floor Conference Center at 1445 Ross Avenue, Dallas, Texas. Registration for this event closes May 2, 2016. https://www.fbo.gov/notices/b38dee69419572cdc10f3ec280530101

Cleanup News

SURFACTANT-OXIDANT CO-APPLICATION FOR SOIL AND GROUNDWATER REMEDIATION

Dahal, G., J. Holcomb, and D. Socci.
Remediation Journal, Vol 26 No 2, 101-108, 2016

In situ chemical oxidation (ISCO) treatments can leave sites with temporarily clean groundwater that is subject to contaminant rebound when sorbed and free-phase contaminants leach back into the aqueous phase. Surfactant-enhanced in situ chemical oxidation (S-ISCO®) uses a combined oxidant-surfactant solution to provide optimized contaminant delivery to the oxidants for destruction via desorption and emulsification of the contaminants by the surfactants. This paper provides an overview of S-ISCO technology, followed by a cleanup case study at a coal tar-contaminated site in Queens, New York. S-ISCO implementation over a 5-month period consisted of simultaneous injections of VeruSOL-3, sodium persulfate, and sodium hydroxide into 34 wells. Data points from the site illuminate how S-ISCO delivers desorbed contaminants without uncontrolled contaminant mobilization, as desorbed and emulsified contaminants are immediately available to the simultaneously injected oxidant for reaction. *This paper is **Open Access** at*
http://onlinelibrary.wiley.com/doi/10.1002/rem.21461/full.

ERD OF RESIDUAL TCE DNAPL ACHIEVING NONDETECT FROM A SINGLE INJECTION OF FOOD-GRADE WASTE

Schaffner, I.R., C.L. Leavey, K.J. Davis, D.V. Takoushian, and K. Ewing.
Remediation Journal, Vol 26 No 2, 87-100, 2016

Residual TCE DNAPL was identified in a deeper interval of an overburden groundwater system at a manufacturing facility located in northern New England. Site hydrostratigraphy is characterized by two laterally continuous and transmissive zones consisting of fully saturated fine sand with silt and clay. The primary DNAPL source was identified as a former dry well with secondary contributions from a proximal aboveground TCE storage tank. A single additive injection event in 2001 of a food-grade injectant formulated with waste dairy product and inactive yeast enhanced residual TCE DNAPL destruction in situ by stimulating biotic reductive dechlorination. The baseline TCE concentration detected was up to 97,400 µg/L in the deeper interval of the overburden groundwater system. Over a 9-year period, enhanced reductive dechlorination achieved >99% reduction in TCE concentrations in groundwater with no evidence of sustained rebound. TCE concentrations remained nondetect. This paper is **Open Access** at http://onlinelibrary.wiley.com/doi/10.1002/rem.21460/full.

PEAK OIL-BAY DRUM COMPANY, TAMPA, FLORIDA

Florida Department of Environmental Protection, 6 pp, 2015

The Peak Oil Company/Bay Drum Company site encompasses an area in Tampa, Florida, where waste oil refining and drum reconditioning operations took place. Soil, surface water, and groundwater in the surficial and Floridan aquifers at the site are contaminated with VOCs (chlorinated solvents and BTEX), SVOCs, metals, pesticides, and PCBs. Contaminated soils have been excavated, treated, and reused on site. Other remedies implemented at the site so far include solidification/stabilization (2001), enhanced bioremediation and air sparging (2005-2011), additional carbon source injections (2010), and installation of another air sparging system (2015). Activities in 2016 will include a review of 1,4-dioxane as a groundwater contaminant of concern and removal of ~3,600 yd ^{3} of chlordane- and Pb-contaminated sediments, followed by wetland restoration using native vegetation.
http://www.dep.state.fl.us/waste/quick_topics/publications/wc/sites/summary/021.pdf

NEWMOA 1,4-DIOXANE ASSESSMENT & REMEDIATION WORKSHOP, 10 DEC 2015, LEBANON, NH

Northeast Waste Management Officials' Association (NEWMOA) Website, 2015

Five of the seven presentations given during the 1,4-Dioxane Assessment & Remediation Workshops provided case studies of technologies implemented for 1,4-dioxane remediation:

- 1,4-Dioxane Remediation Technology Development: An Overview Based on 70+ Projects (P.M. Dombrowski, 15 slides)
- Synthetic Media for Removal of 1,4-Dioxane from Groundwater (S. Woodard, 19 slides)
- 1,4-Dioxane: Connecticut's Perspective (S. Pociu, 9 slides)
- 1,4-Dioxane Case Study, Eastham Landfill Eastham, Massachusetts (P. Locke, et al., 10 slides)
- 1,4-Dioxane: New Hampshire's Experience (J.M. Regan, 12 slides)

http://www.newmoa.org/events/event.cfm?m=175

ENHANCED TREATMENT WETLANDS FOR ETHANOL REMOVAL

Ludlow, A. and K. Szymaszek.
IPEC 2015: Proceedings of the 22nd Annual International Petroleum Environmental Conference, 32 PowerPoint slides, 2015

Construction of an enhanced subsurface flow treatment wetland is planned to address petroleum contact water at a bulk petroleum terminal in Albany, New York. The contact water is composed of gasoline/water and distillate/water mixtures generated and received during routine facility maintenance activities. Consistent with typical petroleum-impacted waste streams, constituents of concern in the wastewater include BTEX and high concentrations of ethanol. The existing wastewater treatment system requires high O&M activities with costly chemical additions that are inadequate to treat the elevated concentrations of ethanol present in fuels. In the wetland system design, the contact water is first pretreated through a tray air stripper and catalytic oxidizer for BTEX removal. The ethanol-laden water then is conveyed through two parallel subsurface-flow wetlands where aerobic biodegradation removes the ethanol. Treatment efficiency is further improved through incorporation of supplemental subsurface aeration methods to support the microbial populations during winter operations. Treated effluent is conveyed to the nearby river for discharge under the SPDES progra**m**http://ipec.utulsa.edu/Conf2015/Manuscripts/Ludlow_Enhanced.pptx

Demonstrations / Feasibility Studies

HIGHLY SUCCESFUL ERD PILOT EVALUATION

Armstrong, K.C. and J. Romeo.
IPEC 2015: Proceedings of the 22nd Annual International Petroleum Environmental Conference, 23 PowerPoint slides, 2015

Groundwater at the NASA Stennis Space Center facility has TCE in deep water-bearing units outside the influence of existing pump-and-treat recovery systems. An enhanced reductive dechlorination pilot evaluation was conducted using ERDenhanced™, a patented carbohydrate-based formulation containing macro-micro nutrients designed to stimulate native microbes and enhance in situ chlorinated alkene destruction. The pilot was implemented to confirm additive efficacy and collect full-scale pre-design remediation data. Passive Release Sock (PRS) units were deployed in test-well 06-12 MW to amend the groundwater with ERDenhanced and create a limited area of influence. Over a 14-month period, groundwater from test well 06-12 MW had a >96.9% reduction in TCE concentrations, with a >81.9% reduction in the parent-daughter ratio indicative of enhanced reductive dechlorination. After an initial >85.5% reduction in cis-1,2-DCE, a 1,530% increase was observed at 4 months, followed by a >91.1% reduction by evaluation end. No VC or ethene was detected during this period. Significant reduction in TCE concurrent with increased cis-1,2-DCE is consistent with biotic dechlorination. Indicator parameter data consistent with anaerobic, chemically reducing conditions were recorded, progressing through sulfate reduction in test well 06-12 MW where PRS units were deployed.
http://ipec.utulsa.edu/Conf2015/Manuscripts/Armstrong_HighlySuccessful.pptx

A PILOT TO FULL-SCALE SUCCESS STORY: COMBINED ANAEROBIC BIOSTIMULATION AND AEROBIC BIOAUGMENTATION FOR EXPLOSIVES-CONTAMINATED GROUNDWATER CLEANUP

Michalsen, M., S. Gelinas, A. King, N. Wilson, R. Wilson, F. Crocker, C. Jung, et al.
Platform, Panel and Poster Abstracts: Third International Symposium on Bioremediation and Sustainable Remediation Technologies, 18-21 May 2015, Miami, Florida. Battelle Press, 2015

Explosives-containing wastewater disposal to unlined lagoons contaminated the groundwater at the Umatilla Chemical Depot near Hermiston, Oregon. The less soluble explosives (e.g., TNT) generated a small plume while highly soluble RDX formed a larger plume, currently over 200 acres in size. Three field tests were performed: (1) Corn syrup (substrate)-amended site groundwater was injected through an infiltration gallery underlying the original source area three times over the course of two years. (2) Substrate-amended groundwater was injected into three wells over a one-month period while using extraction wells to facilitate distribution. (3) A series of replicate push-pull tests (PPTs) was conducted to quantify rate and extent of RDX transformation in wells that received aerobic bioaugmentation treatment compared with wells that received aerobic and anaerobic biostimulation treatments. The infiltration gallery injections achieved targeted 24 mM substrate concentration over 1.5 acres within the source area, reduced explosives concentrations to cleanup levels, and sustained reduced concentrations over two years via anaerobic biostimulation. Substrate-amended groundwater injections in three wells under forced gradient conditions followed by ambient gradient transport achieved substrate distribution over two additional acres. Preliminary PPT results showed that aerobic bioaugmentation supported rapid, more complete RDX removal compared to aerobic biostimulation; however, RDX degradation rate and extent decreased with time in the aerobic bioaugmentation treatment, possibly due to substrate concentration and injection frequency. The pilot results support future full-scale use of anaerobic biostimulation in the commingled source area explosives plume and aerobic bioaugmentation in the distal RDX plume.

IN SITU SOLIDIFICATION (ISS) OF RIVER SEDIMENTS: PILOT DEMONSTRATION AND DISCUSSION OF ISS AS A REMEDIAL ALTERNATIVE TO DREDGING AND CAPPING

Jansen, P., M. Sabulis, and J. Clock.
Remediation Journal, Vol 26 No 2, 25-49, 2016

In the first successful use of ISS techniques to solidify underwater sediments containing coal-tar NAPL from a former manufactured gas plant, cementitious grout was mixed with the sediments in situ to create a monolith that immobilized the contaminants, significantly decreased the hydraulic conductivity, and vastly decreased contaminant leaching potential of the sediments. The project utilized a customized marine platform (modular floats, tug boats) and full-scale ISS equipment (auger rig, silos). Operational parameters were varied to provide a range of data for use in planning future ISS projects on the water.*This paper is* ***Open Access*** *at* http://onlinelibrary.wiley.com/doi/10.1002/rem.21456/full.

PROVIDENCE MINE BROWNFIELDS CLEANUP AND PHYTOREMEDIATION PILOT STUDY

Leach, K. and J. Lauder.
Sierra Streams Institute, Poster, 2015

The Providence Mine Brownfield site is a 45-acre property owned by the City of Nevada City located ~1 mile downstream of downtown Nevada City. The Providence Mine was a large hard rock gold mine operated from 1851 to 1919, producing an estimated $20 million in gold and associated minerals. The operation encompassed a 40-stamp mill and chlorination works where releases of mercury and concentrated heavy metals likely occurred. The Providence Mine Brownfields Cleanup Project occupies two sites in the northwestern portion of the property: the Mine Features Area and the Waste Rock Area. In the Mine Features Area, cleanup included excavation and off-site disposal of a limited amount of highly contaminated soil, trail construction, capping with clean soil, and phytoremediation. In the Waste Rock Area, work consisted of slope benching and regrading to lower mine waste slope angles below the current angle of repose; soil stabilization using physical methods; stream bank restoration using rock walls or rock armoring; and phytoremediation to extract contaminants, stabilize soil, and create access deterrents. A 2012-2013 phytoremediation pilot study showed successful uptake of arsenic, lead, and cadmium into California native vegetation. Additional studies are ongoing.
Poster: http://www.sierrastreamsinstitute.org/documents/SSIPoster2015.pdf
Additional site information: http://www.sierrastreamsinstitute.org/brownfields.html

Research

BIODEGRADATION: UPDATING THE CONCEPTS OF CONTROL FOR MICROBIAL CLEANUP IN CONTAMINATED AQUIFERS

Meckenstock, R.U., M. Elsner, C. Griebler, T. Lueders, C. Stumpp, J. Aamand, et al.
Environmental Science & Technology, Vol 49 No 12, 7073-7081, 2015

This paper contains a critical review of classical concepts, such as the thermodynamic redox zonation, or the use of steady-state transport scenarios for assessing biodegradation rates. The authors also discuss whether the absence of specific degrader populations can explain poor biodegradation. Updated perspectives are proposed on what controls biodegradation in contaminant plumes, including the plume fringe concept, transport limitations, and transient conditions as currently underestimated processes that affect biodegradation*This paper is* ***Open Access*** *at*
http://pubs.acs.org/doi/full/10.1021/acs.est.5b00715?src=recsys.

DETERMINATION OF 1,4-DIOXANE IN THE CAPE FEAR RIVER WATERSHED BY HEATED PURGE-AND-TRAP PRECONCENTRATION AND GAS CHROMATOGRAPHY-MASS SPECTROMETRY

Sun, M., C. Lopez-Velandia, and D.R.U. Knappe.
Environmental Science & Technology, Vol 50 No 5, 2246-2254, 2016

A rapid and sensitive analytical method capable of quantifying 1,4-dioxane (dioxane) over a wide concentration range in a broad spectrum of aqueous matrices was developed to support dioxane occurrence investigations, source identification, and exposure assessment. Based on heated purge-and-trap preconcentration and GC-MS with selected-ion storage, the fully automated method has a reporting limit of 0.15 µg/L and allows 1,3-dioxane to be distinguished from 1,4-dioxane. The method was applied to investigate dioxane occurrence and sources in North Carolina's Cape Fear River watershed, where concentrations ranged from Presentation slides: https://chathamconservation.wikispaces.com/file/view/1,4+Dioxane+Cape+Fear+sm.pdf

MICROCOSM STUDY OF 1,4-DIOXANE BIOTRANSFORMATION

Arve, Philip Henrik, Master's thesis, Clemson University. Paper 2193, 97 pp, 2015

The goal of this research was to evaluate the biodegradability of 1,4-dioxane (dioxane) in a variety of redox environments. Results showed that (1) dioxane is recalcitrant under all anaerobic environments in which it acts as the sole electron donor; (2) the addition of readily degradable substrates may stimulate dioxane biodegradation in sulfate, nitrate, and ferric iron-reducing conditions, although the only ferric iron-amended bottles that showed the possibility of dioxane disappearance also contained a humic acid analog; (3) dioxane is readily degraded to concentrations http://tigerprints.clemson.edu/all_theses/2193/

BIODEGRADATION OF 1,4-DIOXANE: EFFECTS OF ENZYME INDUCERS AND TRICHLOROETHYLENE

Hand, S., B. Wang, and K. Chu.
Science of the Total Environment, Vol 520, 154-159, 2015

Two well-studied degradative bacteria—*Mycobacterium vaccae* JOB5 and *Rhodococcus jostii* RHA1—were examined for their ability to degrade 1,4-dioxane (dioxane) in the presence and absence of TCE under different oxygenase-expression conditions. The two strains were precultured with R2A broth (a complex nutrient medium) before supplementation with propane or 1-butanol to induce the expression of different oxygenases. Both propane- and 1-butanol-induced JOB5 and RHA1 were able to degrade dioxane, TCE, and mixtures of the two, although complete degradation of the dioxane/TCE mixture was observed only in propane-induced strain JOB5. Inhibition was observed between dioxane and TCE for all cells. In general, the more TCE degraded, the greater extent of product toxicity cells experienced; however, susceptibility to product toxicity was found to be both strain- and inducer-dependent. *See more information in S. Hand's thesis at* http://oaktrust.library.tamu.edu/handle/1969.1/154866.

PEROXONE ACTIVATED PERSULFATE TREATMENT OF 1,4-DIOXANE IN THE PRESENCE OF CHLORINATED SOLVENT CO-CONTAMINANTS

Eberle, D., R. Ball, and T.B. Boving.
Chemosphere, Vol 144, 728-735, 2016

In a proof-of-concept lab study, 1,4-dioxane (dioxane) fate was examined during the targeted destruction of aqueous-phase VOCs using a peroxone-activated persulfate chemical oxidation method. The oxidative destruction of dioxane, TCE, and 1,1,1-TCA in single-contaminant batch systems followed pseudo-first-order reaction kinetics and even at the most dilute oxidant concentration lasted for at least 13 days. The rate of oxidation for each contaminant increased linearly with increasing persulfate concentration over the range of oxidant concentrations tested. The rate of oxidative destruction from most easily degraded to least was TCE > 1,4-dioxane > 1,1,1-TCA. Oxidation rates were up to 87% slower in a mixture of these three compounds.

IN-SITU ACTIVATION OF PERSULFATE BY IRON FILINGS AND DEGRADATION OF 1,4-DIOXANE

Zhong, H., M.L. Brusseau, Y. Wang, N. Yan, L. Quig, and G.R. Johnson.
Water Research, Vol 83, 104-111, 2015

Activation of persulfate by iron filings and subsequent degradation of 1,4-dioxane (dioxane) was studied in batch-reactor and column systems to evaluate the potential of a persulfate-enhanced permeable reactive barrier (PRB) system for combined oxidative-reductive removal of dioxane from groundwater. In the absence of iron filings both persulfate decomposition and dioxane degradation was slow. A two-stage reaction mechanism is proposed to describe the oxidation process, consisting of a first stage of rapid, solution-based, radical-driven decomposition of dioxane and a second stage governed by rate-limited surface reaction. Results demonstrated successful persulfate activation using iron filings and the potential to apply an enhanced PRB method for improving in situ removal of organic contaminants from groundwater.

MICROBIAL DECHLORINATION OF POLYCHLORINATED BIPHENYLS, DIBENZO-P-DIOXINS, AND -FURANS AT THE PORTLAND HARBOR SUPERFUND SITE, OREGON, USA

Rodenburg, L.A., V. Krumins, and J.C. Curran.
Environmental Science & Technology, Vol 49 No 12, 7227-7235, 2015

Concentrations of PCBs and PCDD/Fs in sediment and water collected during the site's remedial investigation were examined using positive matrix factorization to look for evidence that PCBs and PCDD/Fs are dechlorinated by anaerobic bacteria. Results indicate that a factor related to PCBs and PCDD/Fs dechlorination was present in the water but not in the sediment. Spatial patterns in dechlorination products suggest that they come primarily from groundwater. Dechlorination products comprise 22% of the PCBs in the water. The Portland Harbor therefore represents the third major U.S. watershed in which PCBs appear to undergo dechlorination in an environment other than sediment, suggesting that the microbial dechlorination of PCBs and PCDD/Fs is more common than previously assumed.

COMPLETE DEGRADATION OF HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE (RDX) BY A CO-CULTURE OF *GORDONIA* SP. KTR9 AND *METHYLOBACTERIUM* SP. JS178

Crocker, F.H., G.A. Blakeney, and C.M. Jung.
Remediation Journal, Vol 26 No 2, 51-58, 2016

The presence of RDX in soil and groundwater is a major contamination issue at many military facilities around the world. *Gordonia* sp. KTR9 metabolizes RDX as a nitrogen source for growth, producing 4-nitro-2,4-diazabutanal (NDAB) as a dead-end product. *Methylobacterium* sp. strain JS178 degrades NDAB as a sole source of nitrogen for growth. A mixed culture of strains KTR9 and JS178 was able to degrade RDX completely, with no difference in rate of RDX degradation by KTR9 alone or in co-culture with JS178. The first-order degradation coefficients of RDX and NDAB in the co-culture were 0.08/hr and 0.002/hr, respectively. In the co-culture that initially contained RDX plus NDAB, strain JS178 degraded the NDAB that was produced by KTR9 as shown by a decrease in the molar yield of NDAB (from RDX) from 1.0 to ~0.11. *This paper is* ***Open Access*** *at* http://onlinelibrary.wiley.com/doi/10.1002/rem.21457/full.

INNOVATIVE CHEMICAL TREATMENT OF TBT (TRIBUTYLTIN)-IMPACTED MARINE SEDIMENTS: A BENCH SCALE STUDY

Ivey, G.A. IPEC 2015: Proceedings of the 22nd Annual International Petroleum Environmental Conference, 36 PowerPoint slides, 2015

A novel chemical reduction oxidation (redox) approach is described for the treatment of tributyltin (TBT) present in contaminated marine sediments. Used globally since the 1950s as an inexpensive biocide and antifouling agent in marine paints to inhibit aquatic organisms, such as barnacles and algae, from adhering to the hulls of ships, TBT has since been determined to be very harmful to invertebrates and vertebrates, including humans. Although banned from use globally for 20 years or more, the presence and persistence of TBT in marine sediments is ubiquitous and poses an ongoing health risk due to the compound's recalcitrant nature. The presented bench-scale study used a unique approach (I-ROX®) for the redox treatment of TBT to achieve trace to nondetectable concentrations in the treated marine sediments, with similar results for associated chemical compounds dibutyltin and monobutyltin. Based on the findings of this study, the approach could be used as an effective treatment for dredged marine sediments to reduce TBT concentrations and allow for sustainable reuse of the treated sediments. http://ipec.utulsa.edu/Conf2015/Manuscripts/Ivey_Innovative.pptx

A NEW PERSPECTIVE ON SUSTAINABLE SOIL REMEDIATION: CASE STUDY SUGGESTS NOVEL FUNGAL GENERA COULD FACILITATE IN SITU BIODEGRADATION OF HAZARDOUS CONTAMINANTS

Czaplicki, L.M., E. Cooper, P.L. Ferguson, H.M. Stapleton, R. Vilgalys, and C.K. Gunsch.
Remediation Journal, Vol 26 No 2, 59-72, 2016

Next-generation sequencing (NGS) was used to categorize fungi and assess fungal biostimulation potential in soils from the Atlantic Wood Industries Superfund site in Portsmouth, Virginia. The study demonstrated the usefulness of NGS as a first-pass identification tool to characterize fungi present in contaminated soils. Original attempts to harness fungi for bioremediation might have focused on fungal genera poorly suited to survive under highly contaminated site conditions. Targeted approaches relying on native indigenous fungi better equipped to survive under site-specific conditions may prove more effective. *This paper is* ***Open Access*** *at* http://onlinelibrary.wiley.com/doi/10.1002/rem.21458/full.

BREAKDOWN OF LOW-LEVEL TOTAL PETROLEUM HYDROCARBONS (TPH) IN CONTAMINATED SOIL USING GRASSES AND WILLOWS

McIntosh, P., Y.A. Kuzovkina, C.P. Schulthess, and K. Guillard.
International Journal of Phytoremediation, [Epub ahead of print] 2015

Researchers conducted a phytoremediation study targeting low-level total petroleum hydrocarbons (TPH) using cool- and warm-season grasses and willows (*Salix* species) grown in pots filled with contaminated sandy soil from the New Haven Rail Yard, Conn. TPH degradation efficiencies were assessed in a 90-day experiment using 20-8.7-16.6 N-P-K water-soluble fertilizer and fertilizer with molasses amendments. Switchgrass grown with soil amendments produced the most aboveground biomass. The greatest reduction in TPH occurred in all vegetated treatments with fertilizer (66-75%) and fertilizer/molasses (65-74%), followed sequentially by vegetated treatments without amendments, unvegetated treatments with amendments, and unvegetated treatments with no amendment. Phytoremediation of low-level TPH contamination was most efficient where fertilization was combined with planted species. *See additional project information in P. McIntosh's thesis at* http://digitalcommons.uconn.edu/gs_theses/705/.

General News

ADDITION OF A SUBSURFACE INTRUSION COMPONENT TO THE HAZARD RANKING SYSTEM: A PROPOSED RULE

U.S. Environmental Protection Agency.
Federal Register, Vol 81, 10371-10432, 29 Feb 2016

U.S. EPA is proposing to add a subsurface intrusion component to the Hazard Ranking System (HRS), the principal mechanism EPA uses to evaluate sites for placement on the National Priorities List (NPL). This addition will allow an HRS evaluation to directly consider human exposure to hazardous substances, pollutants, or contaminants that enter regularly occupied structures through subsurface intrusion in assessing a site's relative risk, and thus enable subsurface intrusion contamination to be evaluated for placement of sites on the NPL. EPA is taking formal comments on the proposed rule through April 29, 2016. https://www.federalregister.gov/articles/2016/02/29/2016-02749/addition-of-a-subsurface-intrusion-component-to-the-hazard-ranking-system Instructions for submitting comments can be found at www.regulations.gov.

PUBCHEM SUBSTANCE AND COMPOUND DATABASES

Kim, S., P.A. Thiessen, E.E. Bolton, et al.
Nucleic Acids Research, Vol 44 No D1, D1202-D1213, 2016

The PubChem open chemistry database — https://pubchem.ncbi.nlm.nih.gov — is a public repository for information on chemical substances and their biological activities, launched in 2004 as a component of the Molecular Libraries Roadmap Initiatives of the U.S. National Institutes of Health. PubChem consists of three inter-linked databases, Substance, Compound, and BioAssay. The Substance database contains chemical information deposited by individual data contributors to PubChem, and the Compound database stores unique chemical structures extracted from the Substance database. Biological activity data of chemical substances tested in assay experiments are contained in the BioAssay database. This paper provides an overview of the PubChem Substance and Compound databases and gives a brief description of PubChem3D, a resource derived from theoretical three-dimensional structures of compounds in PubChem. *This paper is* ***Open Access*** *at* http://nar.oxfordjournals.org/content/44/D1/D1202.

ABSTRACT BOOK: PHYTOTECHNOLOGIES FOR SUSTAINABLE DEVELOPMENT: 12TH INTERNATIONAL CONFERENCE, 27-30 SEPTEMBER 2015, MANHATTAN, KS

International Phytotechnology Society & Kansas State University, 144 pp, 2015

Kansas State University hosted the 12th International Phytotechnologies Conference to provide scientists, engineers, consultants, policy regulators, and other interested individuals the opportunity to explore and discuss how recent developments in plant-based cleanup strategies address current and emerging environmental challenges. https://conferences.k-state.edu/phytotech2015/files/2015/09/80333-IPC-Abstract_Final-1hbvawr.pdf — See also the abstract book for the 11th International Phytotechnologies Conference (Heraklion, Crete, Greece, September 30-October 3, 2014) at http://phytosociety.org/img/docs/abstracts-crete-2014.pdf. Selected papers from the 2014 conference were published in a special issue of the *International Journal of Phytoremediation* (Vol 18 No 6, 2016). See the table of contents for that issue at http://www.tandfonline.com/toc/bijp20/18/6.

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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