## **Technology Innovation News Survey**

## Entries for September 16-30, 2017

## Market/Commercialization Information

BUILDING 8130 HEXAVALENT CHROMIUM REMEDIATION Department of the Air Force, Air Force Global Strike Command, 7 CONS, Dyess AFB, Texas. Federal Business Opportunities, FBO-S817, Solicitation FA4661-18-R-0001, 2017

This acquisition is set aside for woman-owned small business firms under NAICS code 562910. The Government intends to award a firm-fixed-price contract, magnitude between \$250,000 and \$500,000. Building 8130 (~20,720 s.f. constructed in 1959 as a guided missile field maintenance shop and has experienced numerous renovations and additions since that time. This project requires remediation and selective demolition. Contractor shall provide the perso equipment, and permit fees to perform heavy metal and asbestos remediation from the facility. All horizontal surfaces above and including the flow/walls shall be assumed to hold metals-contaminated dust (Cr(VI), Pb, and Cd). See Statement of Work for details. Proposals must be received via email no later than 12:00 noon CT on November 27, 2017. <u>https://www.fbn.gov/notices/22aa93b7165a32305145d289242347ef</u>

## SOLID WASTE MANAGEMENT GRANT PROGRAM Department of Agriculture, Utilities Programs, Funding Opportunity SWMFY2018, 2017

Under this grant program, funds may be used to evaluate current landfill conditions to determine threats to water resources in rural areas; provide technical assistance and/or training to enhance operator skills in the maintenance and operation of active landfills in rural areas; provide technical assistance and/or training to enhance operator skills in the maintenance and operation in the near future with the development/timplementation of losure plans, future land use plans, safety and maintenance planning, and closure scheduling within permit requirements. The closing date for applications is January 2, 2018. Approximately 33 awards are anticipated from estimated total program funding of \$4M. <a href="http://www.grants.gov/web/grants/view-opport/unity.html?copId=297812">http://www.grants.gov/web/grants/view-opport/unity.html?copId=297812</a>

# STRATEGIC ENVIRONMENTAL RESEARCH AND DEVELOPMENT PROGRAM (SERDP) U.S. Army Corps of Engineers, USACE HEC, Ft. Belvoir, VA. Federal Business Opportunities, FBO-5818, 2017

DoD's SERDP office intends to competitively fund research and development for innovative research in FY 2018. Details of the statements of need and the application process are posted at https://www.serdn.estrn.org/Eunling-SerDPS.Solicitations. In Solicitation W91210(-18-S-0001, four needs areas are identified under Environmental Restoration (ER) and two under Munitions Response (MR): 1. ERSON-19-C1: Ecological Risk Characterization of Per- and Polyfluoroalkyl Substances in the Subsurface: Bioavailability, Bioaccumulation, and Biomagnification. 2. ERSON-19-C3: Innovative Treatment Options to Mitigate Munitions Constituent Transport on DoD Testing and Training Ranges.

- 4. ERSON-19-C4: Cost-Effective Options for Treatment of Wastes from Munitions Constituents Manufacturing
- MRSON-19-C1: Detection, Classification, and Remediation of Military Munitions Underwater
   MRSON-19-C2: Modeling Predictions of Munitions Penetration in a Variety of Soils.

Pre-proposals must be received no later than 2:00 PM ET on January 4, 2018, via the SERDP and ESTCP Management System (SEMS). Multiple awards totaling ~\$12M are anticipated. In Solicitation W912HQ-18-5-0000, SERDP seeks proposals for its SERDP Exploratory Development (SEED) program—MRSEED-19-51—for Detection, Classification, and Remediation of Military Munitions Underwater. Projects to establish proof of conceptivel will be funded at a level not to exceed \$200,000 in total cost and ~one year in duration. Proposals must be received by 2:00 PM ET on March 6, 2018, via SEMS.

# SOCIETY OF AMERICAN MILITARY ENGINEERS FEDERAL SMALL BUSINESS CONFERENCE Department of Veterans Affairs, Small and Disadvantaged Business Utilization, Alexandria, VA. Federal Business Opportunities, FBO-5805, Solicitation 00036, 2017

The Society of American Military Engineers (SAME) Federal Small Business Conference is an annual event where the public and private sectors come together to help federal agencies succeed with their small business missions and mark research. Around 2,500 attendees are expected at the 2017 meeting, which will be held November 14-517, 2017, at the David L. Lawrence Convention Center in Pittsburgh, Pennsylvania. Pre-conference courses and training are available November 14. For details and registration, visit <u>hthm</u>//uww.samebc.cm</u>, Interested parties do not need to be a SAME member to attend. Among the many NAICS codes of interest list activates are 541620 [Environmental Consulting Services], 541690 (Other Scientific and Technical Consulting Services), 541712 (Research and Development in the Physical, Engineering, and Life Sciences [except Biotechnology]), 562211 (Hazardous Waste Treatment and Disposal), and Sci2910 (Remetaliston Services). <u>https://www.NAIMbSrivAct.01111005RIN011601111005RIN011601</u>

# 2017 ARKANSAS REGIONAL INDUSTRY DAYS FORUM: SMALL BUSINESS U.S. Army Corps of Engineers, USACE District, Little Rock, Arkansas. Federal Business Opportunities, FBO-5816, Solicitation 2017-industry5, 2017

The U.S. Army Corps of Engineers, Little Rock District will hold the 2017 Arkansas Regional Industry Days on December 6 and 7, 2017. This two-day event will be held at the Arkansas Regional Innovation Hub located at 201 E. Broadway in North Little Rock. This event will provide industry with opportunities to network with government and other large and small business contractors; discuss upcoming contracting opportunities; and allow training in important contracting topics. Registration information is available at <u>thirs (Jong Unformatic Rose 2017)</u> Zingustry 2017). This event (Jong Unformatice) as available at <u>thirs (Jong Unformatice)</u> Registration for this event (Joses at 11:39 PM ET on November 30, 2017). <u>This (Jown Monte)</u> The State Sta

## Cleanup News

# REGULATORY CLOSURE OF A LARGE GROUNDWATER PLUME AND REDEVELOPMENT AT A LEGACY AEROSPACE SITE: NASA, DOWNEY, CA Payne, F., P. Nicolay, K. Stevens, P. Weaverling, S. Potter, and K.S. Houston. Groundwater Solutions: Innovating to Address Emerging Issues for Groundwater Resources, August 8-9, 2017, Arlington, VA. Paper 1160, 2017

Regulatory closure has been achieved for the 4,000-ft plume of chlorinated solvent constituents (PCE, TCE, and daughter products) underlying the former NASA Industrial Plant located in Downey, Calif. Initial treatment with soil vapor extraction (2000-2008) was followed by installation of 10 injection well transects (144 injection wells) perpendicular to groundwater flow to support an inject-and-drift carbohydrate amendment process that stimulated enhanced reduction (2000-2008) was followed by installation of 10 injection wells) be prependicular to groundwater flow to support an inject-and-drift carbohydrate amendment process that stimulated enhanced reductive vere also implemented. The site was in post-remediation monitoring 2012-2016, and the Los Angeles Regional Water Quality Control Board issued a northither equivements-for groundwater letter in March 2017. At the former HASA Industrial Jenat, a large plume cleanup was achieved concurrent remediation monitoring 2012-2016, and the Los Angeles Regional Water Quality Control Board issued a northither equivements-for groundwater letter in March 2017. At the former HASA Industrial Jenat, a large plume cleanup was achieved concurrent remediation in the groundwater letter in March 2017. At the former HASA Industrial Jenat, a large plume cleanup was achieved concurrent remediation and the standard and the standard information on this cleanup under Sitter Japanet Stattard Industrial Log and Log

# FUNCTION AND PERFORMANCE OF PHYTOINTEGRATED<sup>®</sup> REMEDIATION SYSTEMS ON DEEP GROUNDWATER AND/OR TARGETED HORIZONS: HYDRAULICS AND TREATMENT Gatliff, E.G., P.J. Linton, D.J. Riddle, B.E. Smith, P.R. Thomas, M. Wissler, and J. Fronczek. IPEC 2016: 2374 Annual International Petroleum Environmental Conference, 25 slides, 2016

PHYTO-ASSISTED REMEDIATION OF A CREOSOTE-CONTAMINATED SITE: A LONG-TERM STUDY Widdowson, M.A., B.J. Harding, and J.T. Novak. 10th Intermational Conference on Remediation of Chiorinated and Recalcitrant Compounds (Palm Springs, CA; May 2016). Battelle, Columbus, OH. Presentation E-068, 2016

Decades after the discovery of creosote DNAPL at a legacy rail-tie yard through a 20-year on-site program of remediation, no further action is required. Site closure was accomplished through a combination of source removal, hydraulic containment, and phytoremediation of target PAHs in soil and groundwater. The creosote source derived from a former dip pond and an aboveground storage tank. PAH contamination was present as a dissolved phytometry of a combination of account phytometry of a combination of source removal, hydraulic containment, and phytoremediation system enabled in situ measurement of an advected from a former dip pond and an aboveground storage tank. PAH contamination was present as a dissolved phytometry of a combination of a groundwater collection system enabled in situ measurement of water and naphthalene uptake by the trees. A significant reduction in the areal extent of the PAH plume was seen in the upper half of the 2-m thick saturated no naphthalene uptake by the trees. A significant reduction in the areal extent of the PAH plume was seen in the upper half of the 2-m thick saturated no pake fract graves and account of dissolved transpiration ranged from 15 to 49 Ud. Naphthalene mass loss resulting from plant uptake was ~335 mg/d. Final performance monitoring work in 2015 included assessment of the health and physical attributes of the existing hybrid popiar trees stand, groundwater sampling and assessment and saturate soil include plant and beneficiant of a sature stand.

## REQUEST FOR AMENDED RESTRICTIVE COVENANT FOR THE SCHMID 32ND STREET PROPERTY, WASHOUGAL, WASHINGTON: VOLUNTARY CLEANUP PROGRAM Washington State Department of Ecology, 80 pp, 2017

Starting in the mid-1930s, the Schmid 32nd Street site was used for agricultural and residential purposes. Light industrial use of the property began in the 1950s, with the main shop/office building constructed in the 1970s. Other structures were constructed in the 1970s. Other structures were constructed in the 1970s and basis operations included heavy equipment maintenance and repair power washing, annoblasting, equipment Storage, and administrative lusiness operations. All dructures were removed from the property by and basis operations in the 1970s. Other structures were removed from the property by and basis operations in the 1970s operations in the 1970s operations in the 1970s operations and repair operations and property by another the structures were removed from the property by and basis operations operations. All dructures were removed from the property by another the structures were removed from the property by another the structures been removed from the property by another the structures were removed from the property by another the structures been removed from the property by another the structures been removed from the property by another the structures been removed from the property by another the structures been removed from the property by another the structures been removed from the structures been removed from

## **Demonstrations / Feasibility Studies**

DEMONSTRATION AND COMMERCIALIZATION OF THE SEDIMENT ECOSYSTEM ASSESSMENT PROTOCOL (SEAP): ESTCP COST AND PERFORMANCE REPORT Rosen, G. ESTCP Project 201130, 83 pp, 2017

This project was designed to demonstrate, commercialize, and promote regulatory awareness and acceptance of the Sediment Ecosystem Assessment Protocol (SEAP), an integrated assessment ecological risk assessment approach develo under SEXDP Project ER-1550, which was focused largely on the performance of a field-deployed device referred to as the Sediment Ecotoxicity Assessment Ring (SEA Ring). The now commercially available SEA Ring, developed and refine under this project, consists of a circular caroused largely on the performance of a field-deployed device referred to as the Sediment Ecotoxicity Assessment Ring (SEA Ring). The now commercially available SEA Ring, developed and refine technology verification under EPA's Environmental Technology Verification program, were used to assess performance. <u>https://www.serdn-estro.rom/content/downland/45724/4578/Rin/ER-3028/008%20Performance/%20Report.odf</u>

# EVALUATING LONG-TERM IMPACTS OF SOIL-MIXING SOURCE-ZONE TREATMENT USING CRYOGENIC CORE COLLECTION Olson, M., W. Clayton, T. Sale, S. De Long, M. Irianni-Renno, and R. Johnson. ESTCP Project Re-201587, 232 pp, 2017

This project focused on DNAPL source zone remediation using soil mixing with zero-valent iron and bentonite, a technology referred to as ZVI-clay soil mixing. In November 2012, the soil mixing technology was implemented in a TCE DNAPL source zone at Site 17, Naval Support Facility Indian Head, Maryland, Four years of remediation performance data indicate that TCE concentrations in soil and groundwater within the treated-soil zone had been reduced by up to four and five orders of magnitude, respectively. Groundwater concentrations in portions of the former-DNAPL source-zone approached MCLs within four years of soil-mixing completion. To assess post-remediation performance data representing both high-permeability and low-permeability soil strata were collected using cryogenic core collection. <u>https://www.serdn-estro.org/content/downal/dS611473408/file/FE-21488/Bile/FE-214</u>

# CONTAMINANT FLUX REDUCTION BARRIERS FOR MANAGING DIFFICULT-TO-TREAT SOURCE ZONES IN UNCONSOLIDATED MEDIA Higgins, E.A., P.R. Kulkarni, C.J. Newell, and B.A. Strasters. ESTCP Project Re.201328, 165 pp, 2017

# VALIDATION OF PASSIVE SAMPLING DEVICES FOR MONITORING OF MUNITIONS CONSTITUENTS IN UNDERWATER ENVIRONMENTS Rosen, G., M. Colvin, R. George, G. Lotufo, C. Woodley, D. Smith, and J. Beiden. ESICP Projet Re.7201433, SPWART Echnical Report 3076, 248 pp. 2017

Underwater military munitions (UWMM) have the potential to corrode, breach, and leak munitions constituents (MCs) such as TNT, RDX, and their major degradation products into aquatic environments. Accurate assessment of environmental exposure using traditional water, sediment, and tissue sampling and analyses can be challenged by the high level of effort or difficulty required to (1) measure MC at very low (ng/L) concentrations; (2) identify leaking UWMM and exposure the samples or POCS. For estimating the samples, or POCS. For estimating time-averaged water concentrations at underwater sites as previously calibrated for detection of MC in lab studies. This report provides new test of section of the samples, or POCS. For estimating time-averaged water concentrations at underwater sites as previously calibrated for detection of MC in lab studies. This report provides new test of section at a larger scale effort conducted in a bay adjacent to the former Vieques Naval Training Range at Vieques Island, Ploreto RIC. Appendix H comprises a 24-page **Technology User's Nanual**. <u>Hittps://www.section.com/control.field.studies.Plans.people.people.plans.plans.people.pdf.adv.pdf.p</u>

## Research

HEXAVALENT CHROMIUM BIOREDUCTION AND CHEMICAL PRECIPITATION OF SULPHATE AS A TREATMENT OF SITE-SPECIFIC FLY ASH LEACHATES Cason, E.D., P.J. Williams, E. Ojo, J. Castillo, M.F. DeFlaun, and E. van Heerden. Word Journal of Microbiology and Biotechnology 33(5):88(2017)

Researchers demonstrated an efficient and sustainable dual treatment remediation strategy for removal of high levels of Cr(VI) and sulfate introduced by fly ash leachate generated by a coal-fired power station in South Africa. The treatmen consisted of a primary fixed-bed bioreactor kept at a reduction potential for Cr(VI) reduction. Metageomes sequencing clearly indicated a diverse bacterial community containing various bacteria, predominantly of the phylum Proteobacteria, which includes numerous species known for thier ability to detoxify metals such as Cr(VI). The bioreactor treatment was followed by a secondary barium carbonate/dispersed alkaline substrate column for sulfate removal. The combination of these biological and chemical systems achieved removal of 99% Cr(VI) and 90% sulfate present in fly ash leachate.

## 1,4-DIOXANE DRINKING WATER OCCURRENCE DATA FROM THE THIRD UNREGULATED CONTAMINANT MONITORING RULE Adamson, D.T., E.A. Pina, A.E. Cartwright, S.R. Rauch, R.H. Anderson, T. Mohr, J.A. Connor. Science of the Total Environment 596-597:2362-452(2017)

Scientists examined data collected from U.S. public water systems (PWSs) in support of the recently-completed third round of the Unregulated Contaminant Monitoring Rule (UCMR3) to gain a better understanding of the nature and occurrence of 1,4-dioxane and the basis for estabilishing dirinking water standards. The study confirmed that 21% of the public water supplies detected this compound, a rate that ranks relatively high when compared to the other UNRS contaminants. Dioxane detections and exceedances were primarily associated with large systems, and there was a slightly greater likelihood of dioxane presence in groundwater than in surface water and groundwater source run counters that a table of infiniting water is largely related to contaminate groundwater source run counced evidence of a decreasing trend in concentrations in detection requirement-diate-linequiliset-rontaminanti-monitoring-uile.

# ASSOCIATING POTENTIAL 1,4-DIOXANE BIODEGRADATION ACTIVITY WITH GROUNDWATER GEOCHEMICAL PARAMETERS AT FOUR DIFFERENT CONTAMINATED SITES da Silva, M.L.B., C. Woroszyło, N.F. Castlilo, D.T. Adamson, and P.J.J. Alvarez. Journal of Environmental Management 206:60-64(2017) doi: 10.1016/j.jewnman.2017.10.031

Pearson's and Spearman's correlation and linear regression analyses were conducted to discern associations between 1,4-dioxane biodegradation activity measured in aerobic microcosms and groundwater geochemical parameters at four different contaminated sites. Dissolved oxygen, which is known to limit dioxane biodegradation, was existed as a limiting factor. Biodegradation activity was positively associated with dioxane concentrations as well as the number of catabol tima's gene conjuscies encoding dioxane monoxygenase. While environmental factors such as phy. Hemperature, and nutrients might influence dioxane biodegradation, the in situ concentration or substrate dioxane at the tima gene contaminated situation. The situation activity may positively associated with dioxane concentrations as well as the pumber of catabol tima's gene conjuscies encoding dioxane monoxygenase. While environmental factors such as phy. Hemperature, and nutrients might and biodegradation, the in situ concentration or substrate dioxane at the tima gene constant influence dioxane biodegradation activity measured in aerobic microcosms and generates. Under low dioxane concentrations, the contaminant likely wou have greater difficulty attenuating naturally.

USING AEROBIC COMETABOLIC BIODEGRADATION AND GROUNDWATER RECIRCULATION TO TREAT 1,4-DIOXANE AND CO-CONTAMINANTS IN A DILUTE PLUME Chu, M.-Y.J., P. Bennett, M. Dolan, M. Hyman, R. Anderson, A. Bodour, and A. Peacock. The 10th International Conference on Remediation of Chlorintated and Recalicitant Compounds (Palm Springs, CA; May 2016). Battelle, Columbus, OH. Poster F-010, 2016

Although numerous studies on aerobic cometabolic biodegradation (ACB) of 1.4-dioxane (1.4-D) have been published, most of them have been lab studies at high 1.4-D concentrations, not the low levels typically found at cleanup sites. A field test is underway at the former McClellan AFB to evaluate the potential of ACB to treat 1.4-D and co-contaminants in a dilute plume using groundwater recirculation to deliver substrates along with bioaugmentation. Groundwater is aerobic and contains 1.4-D (<50 mg/L), 11-DCA (<10 mg/L), and TCE <5 mg/L). An injection/extraction well plant, a monitoring network, and a nabove-ground substrate delivery substrates along with bioaugmentation. Groundwater capable of degrading MTBE had substantial 1.4-D transformation activity, when using propane as the pointary substrate. Following the biostimulation phase, the recirculation zone will be biosugmented. Line Califorate definite-contrabiolic-contrabiolic-biodegradation contrabis 1.4-D transformation activity.

# ----SIMULTANEOUS DETERMINATION OF THE POTENTIAL CARCINOGEN 1,4-DIOXANE AND MALODOROUS ALKYL-1,3-DIOXANES AND ALKYL-1,3-DIOXOLANES IN ENVIRONMENTAL WATERS BY SOLID-PHASE EXTRACTION AND GAS CHROMATOGRAPHY TANDEM MASS SPECTROMETRY Carrera, G., L. Vegue, M.R. Boleda, and F. Ventura. Journal of Chromatography 1467:1-13(2017)

The suitability of a solid-phase extraction method and further analysis by GC/MS-MS for simultaneous determination of 1,4-dioxane, alkyl-1,3-dioxanes, and dioxolanes has been demonstrated. Recoveries in surface waters spiked at 25 ng/L ranged from 76-105%, whereas method quantification limits varied from 0,7 to 26 ng/L for idoxanes and dioxolanes, and dioxolanes, and 50 ng/L for 1,4-dioxane. Uncertainties were evaluated at two different concentrations, 0.02 µg/L and 0.4 µg/L, with values of 25% for 1,4-dioxane dioxolanes. The methodology was applied successfully to samples from the aquifer of the Lobregat River in Northeast Spain.

HIGH-RESOLUTION SITE CHARACTERIZATION OF 1,4-DIOXANE SITES USING NEW ON-SITE, REAL-TIME ANALYSIS Davis, W.M., C.P. Antworth, C.A. Horrell, J. Wright, and P. Curry. The 10th International Conference on Remediation of Chlorinated and Recalcitrant Compounds (Palm Springs, CA; May 2016). Battelle, Columbus, OH. Presentation F-001, 22 slides, 2016

Current lab methods for 1,4-dioxane use either purge and trap (EPA Methods 524.2 or 8260b) or solid-phase extraction (EPA Method 522). Due to the high water solubility of 1,4-dioxane, purging methods show high limits of detection and require special method adjustments, including heating the sample and/or addition of salt, Solid-phase extraction methods are time consuming with multiple steps, including concentration of the final extract to obtain the desired sensitivity. The sampling ion trap mass spectrameter (DSTIMS). This method has been demonstrated to provide quantitative analysis of 1,4-dioxane to limits of detection of 1.2 µg/L or groundwater and 55 µg/kg for solid-phase extraction and the extremely sing and the sample and/or addition of salt. Solid-phase extraction methods are time consuming with multiple steps, including concentration of the final extract to obtain the desired sensitivity. The mass spectrameter (DSTIMS). This method has been demonstrated to provide quantitative analysis of 1,4-dioxane to limits of detection of 1.2 µg/L or groundwater and 55 µg/kg for solid-phase extraction at the rapid DSTIMS analysis (5 1,4-dioxane to limits can be sensitive). The sample section can be seen demonstrated to provide quantitative analyses per day. The method has been demonstrated to provide up to 50 on-site analyses per day. The method has been demonstrated to provide up to 150 con-site analyses per day. The method has been demonstrated to provide up to 150 con-site analyses per day. The method has been demonstrated to provide up to 150 con-site analyses per day. The method has been demonstrated to provide up to 150 con-site analyses per day. The method has been demonstrated to provide up to 150 con-site analyses per day. The method has been applied to provide high-resolution site characterization at a number of sites. Case studies are presented.

# PREDICTING DNAPL SOURCE ZONE AND PLUME RESPONSE USING SITE-MEASURED CHARACTERISTICS Annable, M.D., K. Hatfield, J.W. Jawitz, M.C. Brooks, A.L. Wood, and P.S.C. Rao. SERDP Project ER-1613, 69 pp, 2017

This report focuses on assessing the level of site characterization needed to support quality decisions regarding remedial strategies and long-term stewardship of contaminated sites using a flux and mass balance-based approach. Site characterization efforts were aimed at understanding the link between DNAPL source zones mass discharage under natural hydrological conditions and under conditions modified by source zone treatment. The transition between forward- and back-diffusion was also explored. <u>bttps://www.serdn-estro.org/content/download/45494/2497/file/F2-1613420/File/Content\_ndf</u>

## GAS PRODUCTION AND MASS TRANSFER DURING ELECTRICAL RESISTANCE HEATING OF CLAY LENSES Martin, Eric J., Ph.D. dissertation, Queen's University, Kingston, ON, Canada. 144 pp, 2017

A study was conducted to develop a mechanistic understanding of remediation in clay lenses in sand by electrical resistance heating. Clay lenses are areas of accumulation for DNAPL and are difficult to remediate. Experiments were performed in a 2-D saturated porous medium comprising an electrically conductive, low-permeability clay lense mbedded within less electrically conductive, higher permeability silica sand. This study is based on an experimental program and mathematical modeling of experimentally were reperimentally measured data. <u>https://acsace.it/acaa.uc</u>

# MANAGING THE NEGATIVE IMPACTS OF GROUNDWATER FLOW ON ELECTROTHERMAL REMEDIATION Hegele, P.R. and B.C.W. McGee. Remediation Journal 27(3):29-38(2017)

Rapid groundwater fluxes often influence subsurface temperature distributions during in situ thermal remediation using electrothermal or conduction heating technologies. Researchers used a numerical approach to evaluate the impact of groundwater flow on electrothermal heating, as well as the effectiveness of several upgradient heat loss management strategies, in a hypothetical treatment volume. Evaluation of design alternatives using upgradient (i) hydraulic barriers, (ii) physical barriers, and (iii) increased energy input indicated that target temperatures can be achieved despite the presence of local groundwater flow velocities greater than 0.3 m/day through careful despine the achieved despite the presence of local groundwater flow velocities greater than 0.3 m/day through careful despine the achieved despite the heated volume. Field data from an electrothermal application are presented where boiling temperatures can be achieved dafter steam injection and upgradient pumping wells were used.

## **General News**

## REMEDIATION MANAGEMENT OF COMPLEX SITES Interstate Technology & Regulatory Council (ITRC), RMCS-1, 2017

This web-based ITRC guide explains how to implement adaptive site management as a holistic, comprehensive, flexible, and iterative process for managing complex sites. The process is applicable to sites where remedy performance predictions are significantly uncertain. Adaptive site management includes setting short-term interim objectives and long-term site objectives that reflect both technical and nontechnical challenges. The remedial approach might involve using multiple technologies at one time and changing technologies over time. Comprehensive planning and scheduled evaluations of remedy performance help decision-makers track remedy progress and adjust the remedy as a domance help decision-makers track remedy progress and adjust the remedy as a domance help decision-makers track remedy progress and adjust the remedy as a domance help decision-makers track remedy progress and adjust the remedy as a domance help decision-makers track remedy progress and adjust the remedy as a domance help decision-makers track remedy progress and adjust the remedy as a domance help decision-makers track remedy progress and adjust the remedy as a domance help decision-makers track remedy progress and adjust the remedy as a domance help decision-makers track remedy progress and adjust the remedy as a domance help decision-makers track remedy progress and adjust the remedy as a domance help decision of remediation and remediation management at complex the timeliness of remedy potimization, reevaluations, or transitions to other technologies or contingency actions. The case studies in this guide describe real-world applications of remediation management at complex its that remedy as a domance deviation and remediation management at complex its that remedy as a domance deviation and remediation management at complex its that remedy as a domance deviation and remediation management at complex its that remedy as a domance deviation and remediation management at complex its that remedy as a domance deviation and remediation managemen

## INVESTIGATIVE STRATEGIES FOR LEAD-SOURCE ATTRIBUTION AT SUPERFUND SITES ASSOCIATED WITH MINING ACTIVITIES

National Academies of Sciences, Engineering, and Medicine. National Academies Press, Washington, DC. ISBN: 978-0-309-46556-4, 112 pp, 2017

Under the Superfund program, U.S. EPA attempts to identify parties that are responsible for site contamination and thus financially responsible for remediation. Identification of potentially responsible parties can be complicated at Superfund sites that have a long history of use and involve contaminants from different sources, as is often the case for mining sites that involve metal contamination; metals occur naturally in the environment, they can be contaminants in the waste generated at or released from the sites, and they can be used in consume roducts that degrade and release the metals back to the environment. This report examines the extent to which various sources contribute to tegrade and release the metals back to the environment. This report examines the extent to which various sources contribute to tegrade and release the metals back to the environment. This report examines the extent to which various sources contribute to tegrade and release that contribute to lead contamination at superfund sites that are near lead-mining areas and focuses particularly on sources that contribute to lead contamination at superfund sites extent to which used contamination at or near Superfund sites. <u>https://doi.org/11/1725/2488</u>

FLUX-BASED GROUNDWATER ASSESSMENT AND MANAGEMENT Cooperative Research Centre for Contamination Assessment and Remediation of the Environment, Adelaide, Australia. CRC CARE Technical Report no. 37, 103 pp. 2016

Although the assessment and management of groundwater contamination traditionally has been driven by contaminant concentrations, concentration data alone sometimes are insufficient to fully understand plume behavior or impact over time. Mass flux and mass discharge concepts, can help fill the gap in understanding and have been applied successfully. This guide was prepared to illustrate how flux concepts, tools, and measumements can be used to assess and manage groundwater contamination. The report includes suggestions for engaging with regulators and other stakeholders. See CRC CARE Technical Report 37 attimic/lawor.creaters.com/indus/creaters.com/ind

# A REVIEW OF THE ENVIRONMENTAL PROTECTION AGENCY'S SCIENCE TO ACHIEVE RESULTS RESEARCH PROGRAM National Academies of Sciences, Engineering, and Medicine. The National Academies Press, Washington, DC. ISBN: 978-0-309-45857-3, 114 pp, 2017

In 1995, U.S. EPA created a program known as Science to Achieve Results, or STAR. IS EPA's primary competitive extramural grants program. This report contains an assessment of the program's scientific merit, public benefits, and overall contributions in the context of other relevant research, and recommends ways to enhance those aspects of the program. This tracking long/10, 1226/24752

# LOW-LEVEL RADIOACTIVE WASTE MANAGEMENT AND DISPOSITION: PROCEEDINGS OF A WORKSHOP National Academies of Sciences, Englineering, and Medicine. The National Academies press, Washington, DC. ISBN: 978-0-309-45678-4, 162 pp, 2017

DOE's Office of Environmental Management is responsible for the safe cleanup of sites used for nuclear weapons development and government-sponsored nuclear energy research. Low-level radioactive waste (LLW) is the most volumetrically significant waste stream generated by the DOE cleanup program. LLW is also generated through commercial activities such as nuclear power plant operations and medical treatments. U.S. laws and regulations related to LLW disposal have evolved over time and across expendes and states, resulting in a complex regulatory structure. The National Academies of Sciences, Engineering, and Medicine or organized a workshop to discuss approaches for LLW management and disposal in the structure. The National Academies of Sciences, Engineering, and Medicine organized a workshop to discuss approaches for LLW management and disposal in the United States and in other major waste-producing countries. This publication summarizes presentations and discussions from the workshop. https://doi.org/10.1122/6/24715

SBIR/STTR AT THE DEPARTMENT OF ENERGY National Academies of Sciences, Engineering, and Medicine. National Academies Press, Washington, DC. ISBN: 978-0-309-43792-9, 434 pp, 2016

The U.S. Congress tasked the National Research Council with undertaking a comprehensive study of how the Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs have stimulated technological innovation and used small businesses to meet federal research and development needs. The Council was also charged with recommending further improvements to the programs. Although converting scientific discoveries into innovations for the market involves substantial challenges, the American capacity for innovation can be strengthened by addressing the challenges faced by its entrepreneurs. Appendix E in this report contains 12 case studies of product development by DOE SBIR/STTR recipients, including several companies that developed or promoted technologies with application in environmental monitoring and characterization. <u>https://doi.org/10.1722/2016</u>

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 <u>adam michaelenga no</u>ver (703) 603-9015 with any comments, suggestions, or corrections.

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