

Technology Innovation News Survey

Entries for April 16-30, 2022

Market/Commercialization Information

NORFOLK REGIONAL HAZARDOUS WASTE REMOVAL AND DISPOSAL

Defense Logistics Agency (DLA) Disposition Service - EBS, Battle Creek, MI
Contract Opportunities at SAM.gov, Solicitation SP450022R0009, 2022

This is a full and open competition under NAICS 562211. The Defense Logistics Agency Disposition Service requires the removal, transportation, and disposal of RCRA hazardous wastes, non-RCRA wastes, State-Regulated wastes, Non-State Regulated wastes, Universal Wastes, Compressed Gases, and PCBs located on or around military installations or within a 50-mile radius of any pickup point listed on the contract in the States of Virginia and North Carolina. The award will be a firm fixed-price indefinite delivery indefinite quantity (IDIQ) contract with one 30-month Base Period followed by one 30-month Option Period. Offers are due by 2:00 PM EDT on June 27, 2022. <https://sam.gov/opp/6f13a81d34124ab7b337d92205b1b26d/view>

ELLSWORTH AFB DOCK 92 HEXAVALENT CHROMIUM MITIGATION

U.S. Department of the Air Force, Air Force Global Strike Command, Ellsworth AFB, SD

Ellsworth AFB is hosting an Industry Day on June 15, 2022, at 10:00 AM MDT for the purpose of exchanging information with interested vendors concerning a future requirement for the cleaning of Dock 92 to remediate the presence of hexavalent chromium throughout the building. Interested vendors should continue to monitor this announcement as a draft Statement of Work will be attached prior to the planned Industry Day. This Industry Day will serve as an open forum to discuss the requirement and the draft Statement of Work with the express purpose of assisting the Air Force in crafting the best possible solution for the requirement and refining the Statement of Work to that effect. A site visit for the Industry Day is planned for June 15, 2022, at 10:00 AM MDT. Interested vendors are highly encouraged to attend this site visit to ensure they attain the greatest possible understanding of the requirement and facility. Base Access Requests will be required for all interested vendors that plan on attending the scheduled site visit. Please submit these requests no later than 12:00 PM on Friday, June 10, 2022. Vendors are asked to provide specific feedback on the requirement and the Statement of Work following the site visit. <https://sam.gov/opp/f47de6df5e1a4094a50bf8e7dd4b5a58/view>

QSS DRAFT REQUEST FOR PROPOSAL

U.S. Environmental Protection Agency, Headquarters Acquisition Division, Washington, DC
Contract Opportunities at SAM.gov, Solicitation 68HERH21R0030, 2022

EPA requests industry feedback from interested parties on any or all sections of the draft Superfund Quality And Sample Support (QSS) RFP and attachments under NAICS code 541611 no later than 4:30 PM EDT on June 10, 2022. The purpose of the QSS Contract is to provide program support and infrastructure through the application of professional, administrative, technical, scientific, analytical chemistry, quality assurance, and information technology services to the Analytical Services Branch (ASB). The QSS Contractor shall provide centralized production processes, and serve as a logistical, technical, systems, and process interface with ASB, EPA Regional personnel, contracted laboratories, and other EPA programs. The Contractor shall support all task areas described in the Performance Work Statement including but not limited to, sample scheduling, information technology solutions, method support/evaluation, guidance development, data review and assessment, cost recovery, litigation support, invoicing support, and other support in accordance with ASB-approved Standard Operating Procedures (SOP) and ASB technical direction. The Contractor must be flexible and able to respond quickly to customers' needs; manage numerous concurrent activities with changing conditions; and provide daily communication, reporting, and problem resolution. Managing change is an important component of ASB's work. Responding to changes in laboratory contract requirements, improvement in procedures, and technological advancements is critical in successful contractor performance. <https://sam.gov/opp/f69adfed654de4a66af6f8696775f800/view>

FY2022 - FY2023 REGIONAL SOURCE REDUCTION ASSISTANCE GRANT

Environmental Protection Agency, Funding Opportunity EPA-REGIONS-LCRD-2022-01, 2022

EPA Regions 3, 4, 7, 8, 9 and 10 are issuing a Request for Applications (RFA) from eligible entities to implement pollution prevention projects through the Source Reduction Assistance grant program. Source Reduction Assistance (SRA) grants can support research, investigation, experiments, surveys, study, demonstration, education, and training using source reduction approaches (also known as "pollution prevention" or "P2"). The Regions are particularly interested in receiving applications for projects that promote practical source reduction practices, tools, and training on P2 approaches to measurably improve human and environmental health by reducing the use of hazardous substances, reducing toxic pollutants, reducing resource use, and reducing expenditures and liability costs to businesses, non-profit organizations and/or communities. The Regions welcome innovative, bold strategies designed to accelerate and drive P2 and source reduction. The Regions are especially interested to support projects in the following priority areas:

- Prevention of Greenhouse Gas Emissions
- Hazardous Materials Source Reduction
- Innovative approaches to conservation of materials and resources
- Environmental Justice through P2 Actions

EPA anticipates awarding 8-27 awards ranging from \$40,000-\$250,000, with up to a total of \$1,135,000 in federal funds available across Regions 3, 4, 7, 8, 9, and 10. Eligible applicants include states, local, interstate, and intrastate government agencies and instrumentalities, federally recognized tribes, inter-tribal consortia, and non-profit organizations formed under Section 501 (c)(3) of the Internal Revenue Code. All projects must take place within the geographic boundaries of Regions 3, 4, 7, 8, 9, and/or 10. The submission deadline is Friday, July 22, 2022, 11:59 pm ET. <https://www.grants.gov/web/grants/view-opportunity.html?oppId=340576>

Cleanup News

ENVIRONMENTAL RESTORATION, INSTALLATION SHAW AIR FORCE BASE

The 2021 Secretary of Defense Environmental Awards, 7 pp, 2021

Hazardous material use at Shaw Air Force Base (AFB) contaminated soil and groundwater with petroleum hydrocarbons, fuel contaminants such as BTEX and PAHs, chlorinated solvents such as TCE or PCE, pesticides and herbicides, PFAS, and 1,4-dioxane. Two years of intensive installation strategic acquisition planning resulted in optimized remediation contracts for three restoration projects that achieved a record 10 site closeouts, 2 responses complete, and 11 optimized remedies. Optimized remedies led to six sites that achieved reductions in groundwater plume footprints, potentially achieving response completion earlier. One major optimization effort was the expansion of a well pump-and-treat system treating co-mingled chlorinated solvent plumes that had migrated off base. The expansion more than doubled the number of extraction wells and added new reinjection wells, added a second air stripper to double treatment capacity, and centralized the deep groundwater treatment of three large, chlorinated solvent plumes that covered nearly one-third of the base's total footprint. The enhanced pump, treat and inject (PTI) system should reduce the estimated cleanup period by 50-75%. Following EPA's release of the drinking water lifetime Health Advisory (HA) levels for PFOS and PFOA, the Department of the Air Force investigated six AFFF release sites. Impacts were confirmed downgradient to on- and off-base drinking water sources. Response actions included retrofitting the PTI system with an ionic exchange resin-based filtration component. An innovative BOS 100® injection barrier was installed to remediate a deep TCE/PCE plume whose leading-edge migrated beyond the base boundary. BOS 100 aqueous slurries were injected into 130 temporary injection points, to proactively intercept and treat the plume's leading edge to prevent further uncontrolled impacts to down-gradient private parcels. Performance monitoring indicated an average 38% reduction in TCE/PCE levels passing through the 20-year barrier. https://www.denix.osd.mil/awards/2021secdef/environmental-restoration-installation/safb-sa/2%20Narrative%20AF%20ER-1%20Shaw%20AFB_508C.pdf See presentation from 2022 Spring DCHWS Symposium on the Boss 100 permeable reactive barrier: <https://drive.google.com/file/d/1j1u4vKXXYBnuK1mS4UlymcsPSIRIwvnlKG/view>

OPTIMIZATION AND PERFORMANCE OF IRON AMENDMENTS FOR IN-SITU CHEMICAL AND BIOLOGICAL REDUCTION

Birk, G. and D. Alden. I 29th Annual David S. Snipes/Clemson Hydrogeology Symposium, 21 October, Clemson, SC, 23 minutes, 2021

This presentation includes results and lessons learned from the field implementation to optimize iron amendments, maximize remediation effectiveness, and minimize project costs.

<https://clemson-app.box.com/s/dmck2528clcl6n7gevrxfvq9n5b6v1/file/906274166756>

COLLOIDAL ACTIVATED CARBON USED TO REDUCE PFAS AND CHLORINATED SOLVENT CONCENTRATIONS IN GROUNDWATER TO BELOW DETECTION LIMITS AT A MICHIGAN ARMY NATIONAL GUARD SITE

Northington, C. I 29th Annual David S. Snipes/Clemson Hydrogeology Symposium, 21 October, Clemson, SC, 23 minutes, 2021

The presentation reviews project design considerations, field activities, and post-application data following a colloidal activated carbon application to treat chlorinated solvents and PFAS in groundwater at the Camp Grayling site. The site was impacted by chlorinated solvents from historical operations at the facility. After the potential for PFAS contamination from onsite firefighting training activities became known, the Michigan Department of Military and Veteran's Affairs tested for PFAS. PFAS, co-mingled with the chlorinated solvent plume migrating towards the property boundary, was found above EPA's drinking water advisory limit. An in situ reactive barrier application of colloidal activated carbon was selected because of the expected rapid removal of PFAS from the dissolved mobile phase, well-established uses for chlorinated solvent sites, and due to its expected lower total project costs when compared to the operation of a mechanical system. The project area was treated with a single colloidal activated carbon application to address groundwater impacts. Mass flux and predictive competitive sorption modeling were utilized to determine the appropriate amount of colloidal activated carbon required. The remediation solution was applied under low-pressure conditions using direct-push technology with separate soil cores and well monitoring to determine distribution. Monitoring results demonstrated the distribution of the colloidal activated carbon was achieved. Post-application groundwater monitoring results demonstrate that PFAS and chlorinated solvent concentrations were reduced to below detection limits within one month and were sustained for over a year and a half.

<https://clemson-app.box.com/s/dmck2528clcl6n7gevrxfvq9n5b6v1/file/906274166756>

HIGHLY COMPLEX THERMAL CONDUCTION HEATING REMEDIATION

Blundy, C. I 29th Annual David S. Snipes/Clemson Hydrogeology Symposium, 21 October, Clemson, SC, 28 minutes, 2021

A thermal conductive heating system was implemented at the Pohatcong Valley Groundwater Contamination Superfund (PVGCS) site to reduce TCE concentrations to <1 mg/kg, achieve a minimum temperature of 90°C at 95% of the temperature sensors, and observe diminishing returns in the vapor stream. The stratigraphy and logistical challenges at the site made remediation highly complex, such as a source zone under an active manufacturing building at 60-120 ft below grade in glacial till with a high density of cobbles and boulders and limited access to the treatment area for remediation. The proposed heater element technology also presented implementation issues due to the variable length, installation angle, and different power requirements required throughout the treatment zone. The heater element design was modified and retosonic drilling was used to address site challenges. The design included a wide variety of heater casing lengths with a heated zone within each heater casing. Nearly five miles of heater wells will be installed to treat 28,000 yd. A unique heater element technology was designed to improve heating efficiency, linear footage wattage flexibility, and protection in angled applications.

<https://clemson-app.box.com/s/dmck2528clcl6n7gevrxfvq9n5b6v1/file/906274166756>

Demonstrations / Feasibility Studies

A RAPID DECISION SUPPORT TOOL FOR ESTIMATING IMPACTS OF A VADOSE ZONE VOLATILE ORGANIC COMPOUND SOURCE ON GROUNDWATER AND SOIL GAS

Johnson, C.D., K.A. Muller, M.J. Truex, G. Tartakovsky, D.J. Becker, C.M. Harms, and J. Popovic. I Groundwater Monitoring & Remediation 42(1):81-87(2022)

The spreadsheet-based Soil Vapor Extraction (SVE) Endstate Tool (SVEET) software functionality was expanded to facilitate quantitative performance assessments. The updated version known as SVEET2 includes expanded input parameter ranges to describe a site, an expanded list of contaminants, and incorporates elements of the Vapor Intrusion Estimation Tool for Unsaturated-zone Sources software to provide soil gas concentration estimates for use in vapor intrusion evaluations. SVEET2 was used to estimate the impact of a PCE vadose zone source on groundwater concentrations, comparing the results to field-observed values at a site where SVE was terminated. SVEET2 estimated PCE concentrations from three separate monitoring wells within 6.0-6.7 µg/L, as compared to actual field concentrations that ranged from 3-11 µg/L PCE. The data demonstrated that SVEET2 can rapidly provide representative quantitative estimates of impacts from a vadose zone contaminant source at field sites. Quantitative estimates can provide a basis to support remedial and/or regulatory decisions regarding the continued need for vadose zone VOC remediation or technical justification for SVE termination.

Said, O.B., C. Cravo-Laureau, F. Armougom, S. Cipullo, M.B. Khelil, M.B.H. Yahiya, A. Douihech, H. Beyrem, F. Coulon, and R. Duran. Environmental Technology & Innovation 24:102037(2021)

SANTA SUSANA FIELD LABORATORY GROUNDWATER PILOT STUDY

A pilot study is planned to evaluate the effectiveness of using enhanced in situ bioremediation (EISB) to remove TCE and VOC-contaminated groundwater that has seeped through fractures into the bedrock at the Santa Susana Field Laboratory (SSFL). A small, closed-loop extraction-recirculation system in the aquifer below the ground surface near Alfa Test Stand 1 will be constructed. The system will extract groundwater from the aquifer and carry it through a pipeline to the surface where emulsified vegetable oil and amendments will be added. Then, it will pipe the amended water into three injection wells to be injected back into the aquifer directly beneath SSFL. The recirculation loop will help distribute the amended groundwater and enhance in situ treatment of the groundwater within the area between the extraction well and injection wells. A dye tracer will provide a greater understanding of how groundwater migrates through the treatment zone. A robust monitoring plan will track the effectiveness of the EVO, nutrients, and microbes at reducing contaminants in the groundwater treatment zone. If the reductive dechlorination occurs as expected and contaminant reduction is sufficient, the use of EISB to clean up groundwater in other source areas will be considered.

https://www.dtrsc-sgfi.com/files/lib_rcra_groundwater/work_plans/69093_NASA_SSFL_EISB_PilotStudy_WorkPlan.pdf

Pilipovic, A.; B.S. Zalesny, Jr.; E.B. Rogers; B.G. McMahon; N.D. Nelson; J.G. Burken; B.A. Hallett; and C.-H. Lin. *J. Forests* 12:474(2021)

Research

Semprini, I. and M. Hyman. SERDP Project ER-2716. 268 pp. 2022.

EVALUATION OF ELECTRICAL RESISTIVITY TOMOGRAPHY TO MONITOR THE TRANSPORT OF PAST RELEASES BENEATH TANK FARMS

A numerical study was conducted to investigate the feasibility and performance using time-lapse 3D electrical resistivity tomography (ERT) for long-term monitoring of a hypothetical tank waste location and migration through the vadose zone. Three hypothetical realistic scenarios were simulated in the ERT evaluation. The first two scenarios assume the same leak amount from different tanks occurring between 1/1/1951 and 12/31/1951 at a rate of 347 m³/year. Scenario 3 assumed the same metallic infrastructure as Scenario 2, with a more recent contaminant leak simulated to have occurred between 1/1/2018 and 12/31/2023 at a rate of 1.89 m³/year. A “true” bulk electrical conductivity (EC) model vs. time reflecting contaminant migration was generated in each scenario. ERT data were simulated using EC models, and time-lapse ERT configurations were used to produce the ERT images. The ERT configurations were evaluated for their ability to detect and track the contaminant migration. The ERT configurations were assumed to have a non-metallic casing. The well configurations successfully monitored tank leak migration through the vadose zone, with bulk EC resolution increasing with the number of down borehole ERT arrays for all scenarios. Using eight boreholes to perform ERT monitoring beneath the tanks provided the best spatiotemporal information. Comparing “true” bulk EC model images demonstrated the ability of ERT images to provide long-term monitoring of the contaminant migration through the vadose zone for all three configurations. Long-term monitoring can be achieved at different resolutions and time scales using ERT evaluation under realistic conditions. <https://www.mdpi.com/1999-4908/15/18/169>

McIntosh, Lisa | 2022 Emerging Contaminants in the Environment Conference 27-28 April, Champaign, IL | 15 slides, 2022

https://www.ideals.illinois.edu/bitstream/handle/2142/114127/McIntosh_Lisa_ECFC22.pdf?sequence=2&isAllowed=y

Hensel, Bruce. | 29th Annual David S. Snipes/Clemson Hydrogeology Symposium, 21 October, Clemson, SC, 15 minutes, 2021

A COMPARISON OF ACTIVATED CARBON REMEDIATION SUCCESS IN FLOODPLAIN SOILS CONTAMINATED WITH DDT AND ITS METABOLITES USING EX SITU AND IN SITU EXPERIMENTATION

Harwood, A.D., S.A. Nuttle, and A.M. Simpson. | Environmental Pollution 295:118687(2021)

Current remediation efforts involving the addition of activated carbon (AC) to floodplain soils downstream of the Velsicol Chemical Corporation Superfund site (VCCSS) offered the opportunity to compare in situ AC remediation with lab experimentation. Bioaccumulation of DDT, DDD, and DDE (DDX) residues by earthworms (*Eisenia fetida*) exposed to lab-aged (LA) or field-aged (FA) soils from four locations were compared. Floodplain soils downstream from the VCCSS were amended with 2% by weight AC in the field and lab and then aged for 3- or 9-months. At 0-, 3-, and 9-months, bioaccumulation assays were conducted with LA and FA soils and tissue concentrations were compared. In both LA and FA soils, AC caused significant reductions (37.01-92.94%) in bioaccumulated DDX in earthworms. Field-collected worms showed a similar trend in reducing bioaccumulated DDX, suggesting AC remediation successfully reduced bioavailable DDX for native organisms. The rate of reduction in bioavailable DDX, however, was significantly faster in LA soils ($\beta = -0.189$, $p < 0.0001$) compared to FA soils ($\beta = -0.054$, $p < 0.0038$). Differences in temperature and methods of AC incorporation between LA and FA soils may account for the differences in remediation rate and suggest lab experiments may overestimated the extent or speed in which remediation occurs in the field.

LABORATORY EVALUATION TO INCREASE THE EFFECTIVENESS OF FIELD-SCALE SOIL TREATING IN THE HAWK ORB 100 AREAS

A lab study was initiated to develop an improved technical understanding of the key controlling geochemical and physical processes to immobilize residual Cr(VI) in Hanford sediments and increase the effectiveness of soil flushing planned at Hanford's 100 Area. To quantify geochemical controls on Cr leaching from sediments, sequential liquid extractions were used to identify aqueous, adsorbed, and solid Cr surface phases before and after water-saturated and unsaturated leach experiments using artificial groundwater (pH 8) and other amendment solutions. Changes in the Cr release rate from sediments were also correlated to changes in Cr surface phases. To quantify physical controls on Cr leaching from sediments, 10-ft-high 1-D infiltration experiments were conducted with differing leach application rates and Cr release rates. The effect of groundwater application and subsequent residual water flux was quantified. Qualitative experiments were also conducted to evaluate the effect of adding a small amount of flow from low permeability zone to the flow from the high permeability zone that exhibits fast flow. The different leach solutions were evaluated to alter the Cr leach behavior. Experiments showed that characterizing Cr mass and release rate differences between sediments could be used to design an efficient leach strategy at field scale. Simulation of the Cr flux in the 10-ft infiltration experiments with differing solutions and infiltration strategies to obtain water flux and Cr release rates over time can be used to test different leach strategies at field scale in the 100-A to 100-F vadose zone to increase the efficiency of Cr leaching, adjust the use of leach solution(s), and determine the time scale of pumping.

PFAS TECHNICAL AND REGULATORY GUIDANCE DOCUMENT

Interstate Technology and Regulatory Council Per- and Polyfluoroalkyl Substances (PFAS) Team, Report No. PFAS-1, updated December 2021

This updated guidance document is designed specifically to support federal and state environmental staff and others, including stakeholders, project managers, and decision-makers, to gain a working knowledge of the current state of PFAS science and practice. Developed by a team of over 400 environmental practitioners drawn from federal and state government, academia, industry, environmental consulting, and public interest groups, it also summarizes the current understanding of all aspects of PFAS from a broad perspective. <https://pfas-1.itrcweb.org/#1-7>

ABSTRACT BOOK: SETAC NORTH AMERICA 42ND ANNUAL MEETING SETAC SCICON, 14-18 NOVEMBER 2021, VIRTUAL
Society of Environmental Toxicology and Chemistry North America (SETAC North America), 376 pp, 2021

The theme of the SETAC North America 42nd Annual Meeting, "Solutions With Respect for Our Community and Environment," was selected late in 2020 at the height of the pandemic to play on the idea of participants coming together to collaborate at an in-person gathering in 2021. The theme was a nod to what was expected to be a change in direction from governments around the world that would be more aligned with SETAC's vision of "Environmental Quality Through Science®". This book comprises the abstracts of the presentations for the platform and poster sessions of the 2021 meeting. <https://scicon4.setac.org/wp-content/uploads/2021/11/SciCon4-abstract-book.pdf>

SUPPORTING CONTAMINATED SITES MANAGEMENT WITH MULTIPLE CRITERIA DECISION ANALYSIS: DEMONSTRATION OF A REGULATION-CONSISTENT APPROACH
Cinelli, M., M.A. Gonzalez, R. Ford, J. McKernan, S. Corrente, M. Kadzinski, and R. Slowinski. I Journal of Cleaner Production 316:128347(2021)

Key decision-making features of the contaminated site remediation process were proposed to select the most appropriate decision support method(s) based on Multiple Criteria Decision Analysis. The process is explained using a case study consistent with the requirements of the U.S. regulation for contaminated site management. PROMETHEE methods, which can provide ranking recommendations of the considered alternatives using variable structures of the criteria, evaluation of the alternatives, and exploitation of the preference model, were selected. Decision analysts and stakeholders should interact and co-develop the process to support an up-to-date application of powerful decision support techniques. The article also explains how such interactions can guarantee a transparent and traceable decision recommendation so that stakeholders can better understand why some alternatives perform comprehensively better than others when a multitude of inputs is used in the decision-making process.

STATE OF THE PRACTICE WORLDWIDE: DEVELOPMENT OF A QUANTITATIVE FRAMEWORK FOR EVALUATING NATURAL ATTENUATION OF 1,1,1-TCA, 1,1-DCA, 1,1-DCE, AND 1,4-DIOXANE IN GROUNDWATER

Adamson, D.T., J.T. Wilson, C.J. Newell, B.A. Strasert, P.C. de Blanc, D.L. Freedman, C. Lebron, and A. Danko.
Groundwater Monitoring & Remediation [Published online 1 March 2022 before print]

A series of quantitative decision frameworks were developed to aid in evaluating monitored natural attenuation (MNA) as a remedy for 1,4-dioxane, chlorinated ethanes, and chlorinated ethenes. The end product is an updated version of BioPIC, an existing decision framework for MNA of chlorinated ethenes. The goal is to follow existing protocols while incorporating more recent insights that have increased the potential viability of applying MNA to address a wider number of contaminants. This includes data supporting the first, secondary, and tertiary lines of evidence for MNA. For the BioPIC update, a similar lines of evidence approach was developed, using information from literature and project-specific data to identify the relevant lines of evidence. A model for predicting contaminant trends over time and distance, including a method to estimate site-specific biodegradation rate constants for chlorinated ethenes, chlorinated ethanes, and 1,4-dioxane, was included within BioPIC. The quantitative software tool provides step-by-step technical guidance to collect and evaluate other lines of evidence, including data associated with targeted ¹⁴C assays, isotope fractionation, biomarkers for degradation, geochemical parameters, and co-contaminant concentrations, to improve the process.

A REVIEW OF THE IN-SITU CAPPING AMENDMENTS AND MODELING APPROACHES FOR THE REMEDIATION OF CONTAMINATED MARINE SEDIMENTS

Labianca, C., S. De Gisi, F. Todaro, M. Notarnicola, and I. Bortone.
Science of The Total Environment 806(Part 3):151257(2022)

The reliability, applicability, and long-term effectiveness of in situ capping (ISC) were investigated, while also comparing reactive and physical ISCs. Activated carbon and organoclay were the most studied amendments for organically-contaminated sediment. In contrast, biochar, clay minerals, and industrial-by products were more often employed in sediments contaminated by metal(loids). There is no better ISC system in absolute terms since technological performance depends on many factors, and only a few experimental investigations included a long-term modeling phase to predict ISC long-term efficiency. The main numerical simulations applied to ISC technology were examined, and most models included simplified transport equations based on diffusion and adsorption. New research directions such as the need for long-term applications on field-scale and cap effectiveness in the presence of site-specific tidal forces and currents are discussed.

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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