Technology Innovation News Survey

Entries for June 16-30, 2023

Market/Commercialization Information

MCCLELLAN CERCLA REMEDIAL INVESTIGATION AND RESPONSE ACTIONS - PIEE U.S. Department of the Air Force, Air Force Installation and Mission Support Center, Joint Base San Antonio, Lackland, TX Contract Opportunities on SAM-gov, Solicitation FA89032380073, 2023

This is an 8(A) set-aside under NALCS code 562910. The U.S. Department of the Air Force requires a contractor to provide A-E Services for Air Force Civil Engineer Center (AFCEC) environmental projects at the former McClellan Air Force Base in California. Activities shall include: developing and updating plans that document the methods and procedures that will be used to conduct the remedial investigation including defining the nature and extent of FPAS contaminator; editorial and analyzing devologic, espolytical, horting and physical, and hydrologic data; collecting and environmental samples such as groundwater; sediment, tissue, and drinking water; which populations may be exposed to contaminants; performing a source-strength assessment of FPAS-impacted vadoes zone sources; conducting a CERCLA Baseline Bisk Assessment to evaluate the risk to human hesith and the environment such as processed to contamination; the site of the si

ENGLAND 0 CERCLA REMEDIAL INVESTIGATION AND RESPONSE ACTIONS AT FORMER ENGLAND AIR FORCE BASE, LOUISIANA (SOL) U.S. Department of the Air Force, Air Force Installation and Mission Support Center, Joint Base San Antonio, Lackland, TX Contract Opportunities on SAMicrosoft FAB9032380092, 2023

NAICS: 562910. THIS ISA N& SET-ASIDE. The 772 Enterprise Sourcing Squadron (ESS) in conjunction with the Air Force Civil Engineer Center (AFCEC), Joint Base San Antonio - Lackland Air Force Base (AFB) in Texas, intends to award a Cost-Plus-Fixed-Fee (CPFF) contract to a Small Business 8(a) Architect-Engineer (A-E) firm to complete Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Remedial Investigations and Response Actions for Perfluorinated compounds (PFC) or Per-and polyfluoralityl substances (PFAS). The place of performance shall be at the Former England AFB, which is a Base Realignment and Closure facility in Alexandria, Louisiana. Offers are due by 3:00 PM CDT on August 10, 2023. There/Lama movied 443-01166/Jointe

REGION 5 CERCLA ENVIRONMENTAL RESPONSE IDIQ (COMBINE) U.S. Department of Agriculture Forest Service, Washington, DC Contract Opportunities on SAM.gov, Solicitation 2970223R0014

Under opportunity of set-sport potentiation to receive the test of tes

R7 ORONOGO DUENWEG MINING BELT - OU1 RA

U.S. Environmental Protection Agency, Region 7 Contracting Office, Lenexa, KS Contract Opportunities on SAM.gov, Solicitation 68HE0723R0047, 2023

This is a total small business set-aside under NAICS code 562910. EPA Region 7 requires the remediation of mine waste at Operable Unit 01 (OU1) of the Oronogo Duenweg Mining Belt (ODMB) Superfund site. The selected remedy for OU1 consists of exavation, consolidation, and disposed of mine waste and associated contaminated soil/sediments, property restoration, and revegetation. The site wastes will be consolidated and disposed of at existing onsite mine waste repositories. The Remedial Design (RD) and the Record of Decision (ROD) issued in June 2010, as amended in 2013, and the Explanation of Significant Differences. (ESD) dated May 2016, for the term "mine waste" includes both visible mine waste (chat, talings, and waster nock) and underent contaminated with heavy metal concentrations exceeding the cleanup goals set forth in the Record of Decision. Redented believery/Indefinite Quantity contract with fixed-unit prices consisting of a base period and four 12-month option periods. Offers are due by 2100, for the 24 dis 24 dis

Cleanup News

USING COLLOIDAL ACTIVATED CARBON TO REDUCE PEAS AND PCE CONCENTRATIONS IN GROUNDWATER TO BELOW MICHIGAN'S DRINKING WATER LIMITS FOR OVER FOUR YEARS 2023 Bioremediation Symposium Proceedings, 8-11 May, Austin, TX, 30 slides, 2023

Equilibrium to the intervent of the expected rapid PFAS revises for the expected rapid PFAS revises to the expected rapid Slides: https://www.ba Longer abstract: https

LARGE FULL-SCALE IN SITU REMEDIATION OF GROUNDWATER WITH HIGH CONCENTRATIONS OF PFAS USING PLUMESTOP™ Mora, R., J. Cuthbertson, J. Buzzell, S. Krenz, R. Moore, K. Gaskill, and A. Kavanaugh.

Elevated PFAS concentrations were identified (generally >10 ppb) in a shallow (0.5 to 3 ft bgs) perched aquifer at a former Fire Training Area with historic AFFF usage. The subsurface consists of a fairly permeable industrial fill and sand, underlain by a continuous clay layer. The remedial objective was to reduce PFAS groundwater concentrations migrating from the perched aquifer to a nearby surface water body. An in situ permeable industrial fill and sand, underlain by a continuous clay layer. The remedial objective was to reduce PFAS groundwater concentrations migrating from the perched aquifer to a nearby surface water body. An in situ permeable industrial fill and sand, continuous clay layer. The remedial objective was to reduce PFAS groundwater concentrations migrating from the perched aquifer to a nearby surface water body. An in situ permeable industrial fill and sand, continuous clay layer. The remedial objective was to reduce PFAS groundwater concentrations, and the percented whether Humerstop" could be addentated with the first of the surface and the presence of co-contaminants. To date, this is the largest application of Plumestop" to read PFAS-contaminated promotwater. Data collected during the prior the prior than the first 6 months showed significant (>99%) reductions in PFAS groundwater concentrations, additional localized injections were conducted to reinforce certain areas of the barrier where subsurface dualed so the state of the State from the moletion and predictive modeling results. Stote states that index function states that is intellated to the surface duale from the State from the State of the Stat

LONG-TERM MONITORING AND MODELING OF PAHS IN CAPPED SEDIMENTS AT THE GRAND CALUMET RIVER Garaa-Rubalcava, U., A.V. Smith, C. Thomas, M.A. Mills, W.A. Jackson, and D.D. Reible. Environmental Pollution 328:1216332(023)

balcava, U., A.V. Smith, C. Thoma nental Pollution 328:121633(2023)

Coring and passive sampling tools were used to assess the transport and degradation of PAHs in an amended cap (sand + Organoclay® PM-199) in the Grand Calumet River during four sampling events from 2012 to 2019. Measurements of three PAHs (phenanthree [Phe], pyrene [Pyr], and benzo[a]pyrene [BaP]) showed a difference of at least two orders of magnitude between bulk concentrations in the native sediments and the remediation cap. Average pore water measurements is as showed lower levels in the cap respective to the native sediments by a factor of at least 7 (Ph eand 3 for Yr. Between the baseline (BL), which corresponds to observing from 2012 to 2019, and the greesurements in change was observed in native sediments (C_{D10}/c_{D10} = 1.0, c_{D1}^{-1.0.2}) for BaP in prove water and there was an increase in the cap (C_{D10} / C_{D1} = 7.0, c_{D1} = 1.0, c_{D1} = 1

Demonstrations / Feasibility Studies

EX SITU SOIL WASHING TO REMOVE PFAS ADSORBED TO SOILS FROM SOURCE ZONES Quinnan J., J. McDonough, C. Theriault, D. Toase, and C. Morrell. ESTCP Project ER20-5258, 1,561 pp, 2022

Quinna J., J. McDanough, C. Ineriauri, D. Tosse, and C. Morfel. ESI DP Project EX20-5258, 1,356 Jp. 2022 A project was conducted at EliseIon Air Force Base (AFB) in Frahmak, Alaska to demonstrate and validate soil washing as a cost-effective mass removal technology to treat PFAS-impacted soil in source zones. The approach focused on treating coarse soil fractions and separating fines for potential treatment by other means, such as landfilling, thermal desorption, or stabilization. The goal was to optimize the treatment triad test believes to minimize wastes requiring more expensive treatment so that the coarse value of the selection of the selection of the selection of the selection AFB concentrations in treated soil washing plant. Roughly 180 tons PFAS compounds measured via DoD Quality Systems Manual 5.3 Table B-14 and PFAS leachate concentrations is a measured by synthetic precipitation leaching procedure testing. PFAS concentrations in treated soils were compared to the Applied to treat the selection AFB concentrations in treated soils were compared to EFA groundwater screening cryleria for SPIO, APFOS, and PFBS. Results confirmed that coarse-grained sand and gravel were successfully treated to more expensive means of treatment, such as inclusions in soil leachate were compared to EFA groundwater screening cryleria for PFOA, PFOS, and PFBS. Results confirmed that coarse-grained sand and gravel were successfully treated to more expensive means of treatment, such as inclusions in treated soils avoid and gravel were successfully treated to more expensive means of treatment, such as inclusions and the set hereit and the set of the master soil market and the set of the impacted of soil of screening cryleria for PFOA, PFOS, and PFBS. Results confirmed that coarse-grained sand and gravel were successfully treated to more expensive means of treatment, such as inclusted to more expensive means of treatment, such as inclusted to more expensive means of treatment, such as inclusted to more expensive means of treatment

TESTING OF A NOVEL MULTI-BRANCH HORIZONTAL WELL REMEDIATION TECHNOLOGY FOR IN SITU REMEDIATION OF CONTAMINATED SOIL AND GROUNDWATER

Feng, C., L. Kong, Y. Wang, A. Gu, and X. Huang. Journal of Environmental Management 344:118583(2023)

Bench and field tests were conducted on a proposed novel multi-branch horizontal well in situ remediation process that integrates vertical/horizontal directional dirlling, rotary injection, and expansion sealing techniques. The studies tested drilling tool performance, drilling accuracy, and injection radius of influence. Results showed that the supporting drilling tool met the process requirements and could complete multi-branch horizontal well constructed using this technology was >9% and the devision between the devision between the devision between the test field measured from the monitoring wells was 25 m. Results show that the process can provide an effective method to remediate contaminated sites. See the introduction and section snippets at https://www.setiencedirect.rom/sections/article

CHARACTERIZATION AND PILOT TESTING TO DEMONSTRATE INNOVATIVE AMENDMENT EMPLACEMENT FOR IN SITU BIOLOGICAL/CHEMICAL REDUCTION OF VOCS (AS DNAPL) IN BEDROCK Wymore, R., E.C. Ashley, and N.Caslonguay. I 2023 Bioremediation Symposium Proceedings, 8-11 May, Austin, TX, 24 slides, 2023

Typinote, m. E. C. Assirey, and r. Casbodyary 1222 bit demonstration (Floberung, e1 may, Assire), A since, 2023 High *circl*, DCC concentrations (270,000 gpt) detected in an 'upgratement well o a multicipation (floberung, e1 may, Assire), A since, 2023 structure informed the initial conceptual site model regarding bedrock fabric and potential preferential flow pathways and identified possible receptors. Bedrock monitoring well installation occurred in two phases: Phase I was informed by fractures installed for pre-design characterization but mapping and Phase II was based on downhole georphysics, hydraulic heads, and containing of assirtation. Characterization but mapping and Phase II was based on downhole georphysics, hydraulic heads, and containing of assirtation. Characterization but bedrock pilot, permeability enhancement (hydraulic fracturing) delivered an amendment slumy of zero-valent icon, emulsified vogetable oil, and a sand proppani rino seven existing fractures in three boreholes. Tilmeter monitoring assessed and underlying bedrock. The amendment was distributed at least 20 ff from all fractures and up to 50 ft or more at some locations. Preliminary resubstatul increases in total organic carbon, the creation of storogy reducing conditions, and widespread VCC degradation within two instructure phases. Slides: https://www.battelle.org/docs/default-source/hidden/2023-bin-symp-presentations/track-a/a3_1235_363_wymore_aurev.pptx.pdf2sfyrsn=62acf0af_3_ Longer abstract; www.battelle.org/docs/default-source/hidden/2023-bin-symp-abstracts/363.pdf2sfyrsn=6ccf734a_3_

Research

THE IMPACT OF SOLUTION IONIC STRENGTH, HARDNESS, AND PH ON THE SORPTION EFFICIENCY OF POLYCHLORINATED BIPHENYLS IN MAGNETIC NANOCOMPOSITE MICROPARTICLE (MNM) GELS Guidereez, A.M., T.D. Dziubia, and J.Z. Hilt. I Gels 9(4);344(2023)

Magnetic nanocomposite microparticle (MNM) gets were used as sobents to remediate PCB 126 as a model organic contaminant. Three MNM systems used were curcumin multiacrylate MNMs (CMA MNMs), queretin multiacrylate MNMs (QMA MNMs), and polyethylene glycol-400-dimethacrylate MNMs (FEG MNMs). The effect of ionic strength, mater hardness, and pH on the scroption reficiency of the MNMs for PCB 126 usa determined through equilibrium binding studies. The ionic strength mater hardness, had a minimal effect on the MNM gets years. In solution and the PCB medicales and with the aromana divert hardness, had a minimal effect on the developed MNM gets can be used as magnetic sorbents for PCBs in groundwater and surface water remediation, provided that the solution pH is controlled. *This article is Open Access at <u>hittings.//www.mdpi.com/7310-2861/9/4/344</u>.*

NITRIFYING MICROORGANISMS LINKED TO BIOTRANSFORMATION OF PERFLUOROALKYL SULFONAMIDO PRECURSORS FROM LEGACY AQUEOUS FILM-FORMING FOAMS Ruyle, B.J., L. Schuttes, D.M. Akob, C.R. Harris, M.M. Lorah, S. Votga, J. Becanova, S. McCann, H.M. Pickard, A. Pearson, R. Lohmann, C.D. Veciti, and E.M. Sunderland Environmental Science & Technology 57(14):5592-5502(202)

This study reports the biotransformation of FHxSA, PFHxSAm, and PFHxSAmS C6 sulfonamido precursors in 3M AFFF with available commercial standards in microcosms representative of the groundwater/surface water boundary. Results show rapid (Nitrosophaeria) and nitrite-oxidizing bacteria (Nitrosophaeria) https://unis.acs.org/doi/ndf/10.1021/acs.ect.202128

DEVELOPMENT OF NOVEL FLUOR MOP MATERIALS FOR REMEDIATION OF PERFLUOROALKYL SUBSTANCES (PFAS) FROM GROUNDWATER Singh, A., R. Lynch, J. Solomon, J.D. Weaver, and A.R. May. Journal of Hazardous Materials 448:13085(2023)

A study synthesized a library of 12 novel adsorbent materials that utilize a chemically well-defined silica support to remove PFAS from contaminated groundwater from a U.S. Air Force base. The library of sorbents probed the importance of fluorous, hydrophobic, and electrostatic components in removal efficacy. The materials were assessed in batch studies with PFOA, PFOS, and PFBA and compared directly to GAC and a deguilibrium data fit well to a Langmuir isotherm model. Results were also validated externally, and the best-performing material removel >90% of eight PFA Stested and could be regenerated up to 5 cycles. Results provide a top-performing material material that, with further testing, can be used to clean up environmentally contaminated water. They also support the theory that a fluorous component, when combined with the electrostatic and hydrophobic components. Jungate electrostatic and hydrophobic components, the material that.

BIOLOGICAL FACTORS INFLUENCING SORPTION AND BIODEGRADATION OF CHEMICALS OF CONCERN ON PARTICULATE/COLLOIDAL ACTIVATED CARBON Juhasz, A., M. Condina, and N. Kawashima. SERDP Project ER21-1059, 81 pp, 2022

Juhasz, A., M. Condina, and N. Kawashima. SERDP Project ER21-1059, 81 pp. 2022 The objective of this project was to gain an understanding of processes influencing the effectiveness of particulate anendments to treat groundwater contaminants; in situ. Specifically, the project assessed whether contaminants sorbed to commercially available particulate activated carbon (PAC) were bioavailable for biodegradation and whether bacteria sorbed to PAC influenced sorptive capacity. ¹⁴C-Phenanthrene was used as a model compound to study biodegradation reactivity in model aquifers to which PAC was amended. ¹⁴C-Compounds were introduced into PAC-amended model aquifers with effluenced sorptive capacity. ¹⁴C-Nenanthrene was used to determine the influences of PAC-bacterial adhesion on commaniant sorptical to determine breakthrough and sorption capacity calculatons. Bacterial interacting with PAC was amended. ¹⁴C-Compounds were introduced into PAC-amended model aquifers with effluent monitored to determine breakthrough and sorption capacity calculatons. Bacterial interacting with PAC, aquifer matrix, or the contaminant torscopy (ISEM) and/or TOF-SIMS to provide complementary data regarding the distribution of PAC within the model aquifer and determine where/how bacteria were interacting with PAC, aquifer matrix, or the contaminant of contences one (ISEM) and/or TOF-SIMS to provide complementary data regarding the distribution of PAC within the model aquifer and determine where/how bacteria were interacting with PAC, aquifer matrix, or the contaminant of contences one (ISEM) and/or TOF-SIMS to provide complementary data regarding the distribution of PAC within the model aquifer and determine where/how bacteria were interacting with PAC, aquifer matrix, or the contaminant of contences one status and and benanthrene- hore-phonenthrene hore degradation. PAC to addition of the hore the information contence on the information contence on the information and the contence on the information contence on the contences on the pho

RESEARCH BRIEF 342 EXPOSURE TO PCBS DURING NURSING LEADS TO TEMPORARY DIABETES-RELATED HEALTH EFFECT National Institute of Environmental Health Sciences, Superfund Research Program (SRP), June 2023

A new study shows exposure to PCBs through a mother's milk could cause intolerance in offspring. The study builds on earlier SRP-funded work by the same group that found connections between maternal PCB exposure and diabetes risk factors in progeny. Researchers aimed to understand how PCB exposure during nursing might affect glucose tolerance and body weight and composition in mice. The study focused on PCB126 and compared mice whose mothers had been treated with PG126 to days 3, 10, and 17 after birth ~ with mice to born to mothers treated with hammes oil-based ilguid. Pups in both groups were allowed to nurse until they were weened at 3 weeks old. Of the day of wealing, the team measured glucose tolerance in each group by administering sugar to the pups, then monitoring their blood glucose levels over two hours. The process was repeated every three weeks until the pups were same at a weeks old. Of the day of wealing, the team measured glucose tolerance in each group by administering sugar to the pups, then monitoring their blood glucose levels over two hours. The process was repeated every three weeks until the pups were send at body regint. The study show hours is the study period. Day of pupperiod to advert and the day of wealing. The study and the day of wealing to the pups were to another sugar to the pups. The study event the day of wealing the flexibility of the day of wealing to advert the day of wealing the flexibility of the day of wealing the day of wealing the flexibility of the day of wealing the day of wealing the flexibility of the day of wealing the day of wealing the day of wealing the day of wealing the study being the day of wealing the day of wealing the day of wealing the study period. Day of advect the day of wealing the day of wealing the study period. Day of advect the day of wealing the day of weali

CALIBRATION OF PERFLUORINATED ALKYL ACID UPTAKE RATES BY A TUBE PASSIVE SAMPLER IN WATER Dunn, M., J. Becanova, J. Snook, B. Ruyle, and R. Lohmann. ACS ESSK Water 3(2):332-34(2023)

The PFAS sampling rate, R_{s} , of a microporous polyethylene tube with a hydrophilic-lipophilic balance sorbent was predicted based on either partitioning and diffusion or solely diffusion. At 15°C, the lab-measured R_{s} for perfluorohexanoic acid of 100 ± 81 ml/day was better predicted by a partitioning and diffusion model (48 ± 1.8 ml/day) across 01-60 cm/s water flow speeds (15 ± 4.2 ml/day diffusion only). For perfluorohexane suffonate, R_{s} at 15°C were similarly diffusion to ± 60 ml/day measured, 120 ± 63 versus 12 ± 3.4 ml/day in respective models). R_{s} values from field deployments were in between these estimates (46 ± 40 ml/day call diffusion) acid). PFAS update was the same for previously biofould membranes in the lab, suggesting the general applicability of the sampler in environmental conditions. Results demonstrate that the polyethylene tube's sampling rates were sensitive to the parameterization of the models used and partitioning-derived values should be applied.

General News

GOUNDWATER ISSUE PAPER IN SITU THERMAL REMEDIATION Davis, E.L. EPA Publication EPA/600/R-23/062, 46 pp, 2023

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REMEDY SELECTION AND OPTIMIZATION CONSIDERATIONS FOR MONITORED NATURAL ATTENUATION Naval Facilities Engineering Command fact sheet, 6 pp, November 2022

Monitored natural attenuation (MNA) is a remedial option for monitoring the reduction of concentration, toxicity, and/or mobility of chemicals in groundwater. MNA can serve as a standalone remedy or be implemented as part of a treatment train through a transition from active treatment to a more passive treatment approach over time. Several lines of evidence are needed to achieve of equilatory acceptance when selecting MNA as a primary remedy or transitioning to MNA as part to a treatment remote a contract of a treatment for a more passive treatment approach over time. Several lines of evidence are needed to achieve of equilatory acceptance when selecting MNA as a primary remedy or transitioning to MNA as part to achieve of equilatory acceptance when selecting MNA as a primary remedy or transitioning to MNA as part to achieve of equilatory acceptance when selecting MNA as a primary remedy or transitioning to MNA as part to achieve of equilatory acceptance when selecting MNA as a primary remedy or transitioning to MNA as part to active the evidence and the selecting MNA as a part to active the evidence and the selecting MNA as a part to active the evidence and the evidence and the selecting MNA as a part to active the evidence and the selecting MNA as a part to active the evidence and the evidence and the selecting MNA as a part to active the evidence and the selecting MNA as a part to active the evidence and the evidence and the selecting MNA as a part to active the evidence and the selecting MNA as a part to active the evidence and the evidence and the selecting MNA as a part to active the evidence and the evidence and the selecting MNA as a part to active the evidence and the selecting MNA as a part to active the evidence and the evidence and the selecting MNA as a part to active the evidence and the evidence and the selecting MNA as a part to active the evidence and the evide

GEOPHYSICS APPLICATIONS TO LUST SITES: CASE STUDIES AND ONLINE TOOLS Werkema, Dale. 127th National Tanks Conference & Exposition, 13-15 September, Pittsburg, PA, 2022.

EPA developed the Environmental Geophysics website to bridge the gap between the basic science of geophysics and its application to environmental problems. The website contains geophysical resources, including an online textbook for geophysical methods relevant to environmental applications, a searchable list of current references, and geophysical terminology. Past and current EPA geophysical research and EPA-funded publications are provided. Geophysical resources, including decision support tools, miscellaneous geophysical utilities, and forward and inverse models are also available. The presentation highlight the free resources as a virtual environmental geophysics library and assists in guiding, selecting, and evaluating the applicability of geophysical methods to environmental objectives. The website is available at <u>the structure of updeversional environmental depophysics</u>.

CHEMICAL RISK ASSESSMENT FOR PFAS IN BIOSOLID Tobias, D. EPA Tools and Resources Webinar Series, 43 minutes, 2023

EPA committed in the agency's EPAS Strategic Readmap to conduct a biocolide risk assessment for FROA and PEOS in biocolide. In this webinar, EPA's Office of Water discuss the current work on assessing risk for PEOA and PEOS in biocolide that will serve as the basis to determine which are regulated on DFFOA and PEOS in appropriate. The presentation covers the regulatory context through which EPA regulates chemical contaminants in biocolides, a bird overset of FAS and PEOS in appropriate CPA has developed to evaluate impacts from biocolids through ingestion of drinking water, crops, milk, and meat and how that framework may be implemented. <u>https://www.epa.ov/isearch.state/epa.alors.and/epa.alor</u>

UPDATE TO THE LIGHT NONAQUEOUS PHASE LIQUID INFILTRATION CONCEPTUAL MODEL Hamper, M. and M. Seyedabbasi. I Remediation 33(3):227-231(2023)

This work updates the 1970s oil spill model that described the infiltration of LNAPL into the subsurface, resulting in an oil pancake depressing the water table within the capillary fringe. The 1970s oil spill infiltration model describes that spilled LNAPL migrates downward through the vadoes zone under the force of gravity with some lateral spreading. The vadoes zone, where liquid pressures are test table. WhAPL penetrates the water table under the the force of gravity with some lateral spreading. LNAPL stopping at and depressing the water table. LNAPL infiltration and capillary frinces experimented uning LNAPL stopping at and depressing the water table. LNAPL infiltration and researce are the forces experimented uning LNAPL stopping at and depressing the water table. LNAPL infiltration and researce are the substrate of the infiltration and creates as the stopping at and depressing the water table. LNAPL infiltration and indigration with egravitational and capillary forces experimented uning LNAPL stopping at and depressing the table. LNAPL releases tops, LNAPL infiltration and release at the substrate of the infiltration conceptual model, the the LNAPL release tops, LNAPL infiltration and indigration bare of the substrates are greater than atmospheric pressure. After the table, LNAPL infiltration and indigration bare structure are associated of the infiltration and ending the pressures are greater than atmospheric pressure. After the table, LNAPL infiltration and indigration bare structure to bar the vadose zo One important two-fluid zone 1970s model, zone

The Technology Innovation News Survey welcomes your comments and suggestions, as well as information about errors for correction. Please contact Michael Adam of the U.S. EPA Office of Superfund Remediation and Technology Innovation at adam michael@epa.gov or (703) 603-9915 with any comments, suggestions, or corrections. Mention of non-EPA documents, presentations, or papers does not constitute a U.S. EPA endorsement of their contents, only an acknowledoment that they exist and may be relevant to the Technology Innovation News Survey