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HEADLINES

WINTER 2019

DoD's Environmental Research Programs

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SERDP AND ESTCP ANNOUNCE 2018 PROJECTS OF THE YEAR

It is with great pride and pleasure that SERDP and ESTCP announce the 2018 Projects of the Year. This year's awards recognize scientific advances and technological solutions to some of the Department of Defense's (DoD) most significant environmental and installation energy challenges. These issues include assessing the effectiveness of remediation in fractured bedrock, characterization of unexploded ordnance in nearshore underwater sites, green processing of energetic material, and much more. Read more about each project in the articles below.

ENDANGERED BUTTERFLIES AS A MODEL SYSTEM FOR MANAGING SOURCE-SINK DYNAMICS ON DEPARTMENT OF DEFENSE LANDS (RC SERDP POY)

DoD lands provide remarkably important habitat for numerous threatened, endangered and at-risk species. As a result, there has been a long-standing research need to collect the data necessary to assess the source-sink consequences of habitat disturbance management and restoration. Dr. Elizabeth Crone from Tufts University and her team led a SERDP-funded project that investigated the source-sink dynamics of species being managed on military lands using three species of endangered butterflies. The team measured demography and movement at all phases of the disturbance cycle following management or restoration. They then used these data to parameterize detailed spatially explicit individual-based simulation models linked to real landscapes with dynamic changes in habitat quality due to management. Finally, the team validated their general approach by comparing patterns in the focal species to general, cross-taxa, patterns. MORE

ANNOUNCEMENTS

SERDP and ESTCP Continue Webinar Series - View Schedule

CALENDAR

March 5
FY 2020 SERDP SEED Solicitation Proposals Due

March 7
FY 2020 ESTCP Pre-Proposals Due

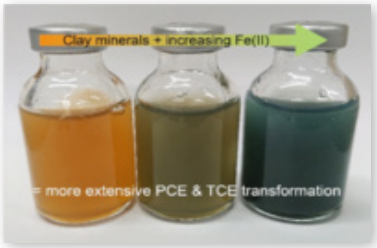
RELATED EVENTS

February 11-14
International Conference on Remediation and Management of Contaminated Sediments
New Orleans, LA

March 25-28
2019 ITRC Annual Meeting
Boston, MA

March 29
ITRC PFAS Training
Boston, MA

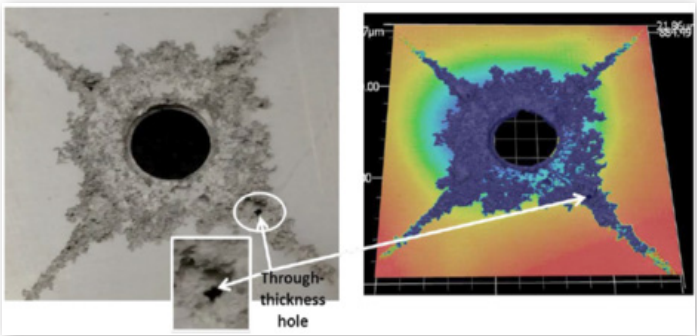
BIOLOGICALLY MEDIATED DEGRADATION OF CHLORINATED ETHENES: A NEW CONCEPTUAL FRAMEWORK (ER SERDP POY)



Chlorinated solvents, such as tetrachloroethene (PCE) and trichloroethene (TCE), are one of the most prevalent pollutants at hundreds of DoD sites, and remain among the most difficult to remediate despite years of intense research and development. Dr. Michelle Scherer from the University of Iowa and her team led a SERDP-funded project that studied the application of a new conceptual framework based on solid-state mineral chemistry to understand biologically mediated abiotic degradation (BMAD) of PCE and TCE by magnetite, iron (Fe) sulfides, and Fe-bearing clays. While it has been long suspected that these minerals play an important role in BMAD of chlorinated solvents, BMAD performance has not been predictable or reproducible at the field scale, or even at the more controlled laboratory scale. **MORE**

ACCELERATED DYNAMIC CORROSION TEST METHOD DEVELOPMENT (WP SERDP POY)

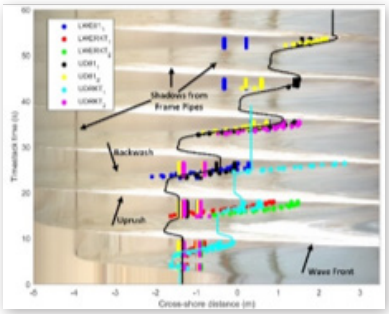
Corrosion, coating degradation, fracture, and wear of weapons systems components continue to be a challenge for the DoD. Many effective legacy technologies used for protection against corrosion contain hexavalent chromium, cadmium, and other hazardous materials. As such, alternative technologies that are more environmentally friendly but have similar performance have been developed. A barrier to more rapid implementation of these technologies is the lack of accurate accelerated corrosion test data. Mr. James Dante and his team from the Southwest Research Institute, NAVAIR, Boeing, Luna Innovations, U.S. Army – AMCOM, the University of Virginia, and the U.S. Army Research Laboratory addressed this challenge by developing an improved dynamic accelerated corrosion test protocol that more accurately predicts material system corrosion behavior in operational environments. **MORE**



QUANTIFICATION OF HYDRODYNAMIC FORCING AND BURIAL, EXPOSURE AND MOBILITY OF MUNITIONS ON THE BEACH FACE (MR SERDP POY)

SERDP has sponsored the development of a simple, engineering model of mobility, burial, and re-exposure of unexploded ordnance (UXO) and UXO- like objects for several years. Several SERDP-funded investigators are contributing to this development through a wide range of in situ and laboratory measurements of the important processes involved and the development of environmental predictions. In situ measurements are challenging, especially in the dynamic environments close to the beach. To collect useful data requires extensive instrumentation, clever experimental design, and a measure of luck to have

the instruments emplaced during high-energy weather events. Dr. Jack Puleo from the University of Delaware and his team developed “smart” mock munitions, and collected detailed measurements of surrogate munitions mobility, burial, and potential re-exposure on the beach face while simultaneously quantifying the governing hydrodynamic and sediment transport process. **MORE**



SUCCESSFUL TECHNOLOGY TRANSITION (EW ESTCP POY)

ESTCP identifies and demonstrates the most promising innovative and cost-effective technologies and methods that address DoD’s high-priority environmental requirements. Two recent examples of EW projects that both demonstrated and successfully transferred innovative technology to an established procurement pathway are the projects Portsmouth Naval Shipyard Microgrid and Ancillary Services, and Software-Defined Wireless Decentralized Building Management System both led by Anthony Colonnese from Ameresco, Inc. The objective of the project at Portsmouth Naval Shipyard (PNS), was to demonstrate that Fast Load Shed (FLS)-capable microgrid controls and Battery Energy Storage Systems (BESS) can be integrated with onsite generation at military bases to enhance the security and reliability of electric service to the base and generate cost savings for the government.

The second project demonstrated a new building management system (BMS) architecture. The demonstrated BMS is built on a decentralized wireless sensor and control platform, where each device can run its own high-level software and can communicate with any other device on the network. As part of the demonstration, the project also obtained a full site Authorization to Operate (ATO) for the wireless BMS platform at the demonstration site, Tinker Air Force Base (AFB).

MORE

CONSPECIFIC ATTRACTION AS A MANAGEMENT TOOL FOR ENDANGERED AND AT-RISK SPECIES ON MILITARY LANDS (RC ESTCP POY)

The movements of wildlife species and the colonization of habitats for federally listed or at-risk species is often unpredictable. This irregularity undermines species management efforts and can interfere with military training. Given the expense and effort taken to manage species on military lands, improved management tools are welcome

and important. Dr. Jinelle Sperry from the US Army Engineer Research and Development Center and her team led an ESTCP funded project that demonstrates the use of conspecific attraction as a cost-effective management tool for endangered and at-risk bird and amphibian species. For conspecific attraction, prerecorded vocalization of the target species are broadcast from a playback system within the focal area. Vocalizations are broadcast throughout the focal species breeding season from the restored habitat, thereby encouraging individuals to settle and breed near the playback system. **MORE**

TREATMENT DEMONSTRATIONS IN FRACTURED BEDROCK (ER ESTCP POY)

Management and remediation of fractured bedrock aquifers impacted with PCE and TCE remain a significant environmental challenge for the DoD. These challenges are due to a combination of the complex fracture flow field, uncertainties associated with contaminant distribution among fractures, microfractures, and the rock matrix, and ultimately the difficulties with understanding these complexities as they relate to remedial impacts on both short and long-term groundwater quality. The costs associated with drilling, testing, and monitoring in these fractured bedrock systems are also a great challenge for site management. Dr. Charles Schaefer from CDM Smith has led a number of projects under both SERDP and ESTCP addressing contamination in fractured rock. He and his project teams have studied bioaugmentation as a cost-effective treatment for dense non-aqueous phase liquid (DNAPL) sources present in the fracture zones. They have also developed and evaluated a novel “push-push” remedial assessment technique, coupled with compound specific isotope analysis, for use as a rapid and cost-effective means to assess the limits of in situ remediation in fractured bedrock systems. **MORE**

GREEN PROCESSING OF ENERGETIC MATERIALS USING RESONANT ACOUSTIC MIXING TECHNOLOGY (WP ESTCP POY)

Cast-cured, high-energy, composite materials are used across the DoD in rocket motors, explosives, and pyrotechnic devices. The current state of the art for producing these materials involves mixing the components using a bowl and impeller then moving that mixture into the vessel intended to hold it. Transferring the material and cleaning the mixing apparatus both produce waste material, require the use of cleaning solvents, and expose workers to hazardous conditions. Dr. Andrew Nelson, and his team from the Naval Air Warfare Center – Weapons Division, addressed this problem by demonstrating a new process called Resonant Acoustic Mixing which eliminates mixing and transferring the mixture separately by mixing energetic materials directly inside the final vessel. Low-frequency, high-intensity vibrations are used in place of impeller blades to process the composite formulations and produce energetic materials that meet military specifications. Mixing the material in situ is expected to reduce costs and increase adaptability and efficiency of production across applicable energetic materials. **MORE**

STRATEGIC ENVIRONMENTAL RESEARCH AND DEVELOPMENT PROGRAM (SERDP)
ENVIRONMENTAL SECURITY TECHNOLOGY CERTIFICATION PROGRAM (ESTCP)

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www.SERDP-ESTCP.org
4800 Mark Center Drive
Suite 16F16, Alexandria, VA 22350

DEMONSTRATION OF CRAWLER-TOWED SENSOR TECHNOLOGIES IN CHALLENGING NEARSHORE SITES (MR ESTCP POY)

ESTCP has sponsored the development of technologies capable of detecting and remediating UXO in nearshore environments, specifically the development of specialized mobility and sensing platforms that are capable of operating in the beach, surf, and tidal areas for many years. This year's ESTCP Project of the Year was headed by Dr. Greg Schultz from White River Technologies, and his project team. Dr. Schultz's project began with an assessment of existing amphibious platforms and their capabilities of towing electromagnetic induction (EMI) sensors in nearshore environments. This assessment included the potential impact of each platform on the underwater environment and each system was assessed for use in environmentally sensitive areas. After evaluating various platforms and technologies, Dr. Schultz and his team developed and demonstrated a robotic crawler-based UXO detection system, using commercially-available EM sensors and commercial-off-the-shelf positioning hardware and software. Dr. Schultz's newly developed system is capable of collecting high quality EMI data in nearshore environments and incorporates an integrated navigation and control system for the acquisition and quantification of high-resolution surveys. MORE

SUCCESSFUL COMPLETION OF THE 2018 SERDP AND ESTCP SYMPOSIUM

The SERDP and ESTCP Symposium took place on November 27-29, 2018. Nearly 1000 attendees representing the research, end-user, and regulatory communities participated in the technical sessions and short courses, presented posters on cutting edge research, and networked with their peers. The efforts of all speakers, session chairs, and instructors were critical to the overall success of the event and were greatly appreciated.

Save the Date! The 2019 SERDP and ESTCP Symposium will be held December 3-5, 2019, in Washington, D.C. Planning for the 2019 Symposium will begin soon and details will be made available once they are finalized. The constructive feedback we received from attendees of the 2018 Symposium will help make the 2019 event even better. Many thanks to all who participated in the 2018 SERDP and ESTCP Symposium and we look forward to seeing you again in December 2019!