PARTNERS IN ENVIRONMENTAL TECHNOLOGY

SERDP Strategic Environmental Research and Development Program

ESTCP

INFORMATION B•U•L•L•E•T•I•N

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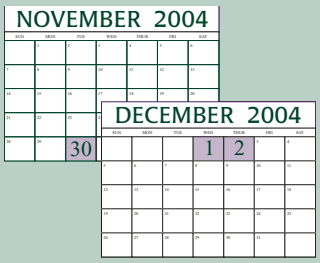
Electromagnetic Induction Workshop Fosters Critical Information Exchange Among Top UXO Researchers

Leading researchers from academia, industry, and government laboratories participated in a workshop in Annapolis, Maryland, February 4–5, 2004, on the application of electromagnetic induction (EMI) to detecting and discriminating unexploded ordnance (UXO). EMI has been identified as a promising, noninvasive geophysical tool for addressing the challenges of subsurface UXO detection and discrimination. The EMI Workshop, hosted by SERDP, ESTCP, and the Army's Environmental Quality Technology (EQT) Program, provided a forum to facilitate collaboration and exchange of technical information among researchers working on distinct but related aspects of EMI application.

By providing improved detection and discrimination of subsurface ordnance, EMI technologies currently under development through SERDP, ESTCP, and the Army's EQT Program have the potential for superior outcomes of munitions response actions and reduced clearance costs for the Department of Defense (DoD). Collectively, the three programs are addressing research areas that include hardware development, phenomenology studies, modeling efforts, signal processing algorithm development, field data collection, and system integration work. The small group discussion format of the workshop enabled researchers to gain a working-level knowledge of a large body of exciting, ongoing work in these areas and in the application of EMI to UXO.

The two-day event opened with an introductory presentation on UXO cleanup case studies provided by Mr. Bob Selfridge of the U.S. Army Corps of Engineers, Engineering and Support Center, Huntsville, Alabama.

See EMI WORKSHOP, page 3



PARTNERS IN ENVIRONMENTAL TECHNOLOGY TECHNICAL SYMPOSIUM & WORKSHOP

"Meeting DoD's Environmental Challenges"

November 30–December 2, 2004
Marriott Wardman Park Hotel ✦ Washington, D.C.
Sponsored by SERDP and ESTCP

This year's technical program will feature comprehensive sessions to illustrate how SERDP and ESTCP research & development and demonstration & validation efforts are assisting the Department of Defense (DoD) to address increasingly complex environmental challenges. Take a look at the preliminary list of technical sessions…

- Advances in Electromagnetic Induction for UXO Detection
- Emerging UXO Detection Technologies
- Cleanup Technologies for Emerging Contaminants
- Source Zone Treatment: Dense Non-Aqueous Phase Liquid (DNAPL) Remediation
- Range Sustainment: Mitigation and Restoration
- Emission Factors for Combustion Sources
- Emission Factors for Noncombustion Sources
- Impacts on Maritime Range Operations
- Preserving Critical Natural/ Cultural Resources
- Coating/Decoating Technologies
- Perchlorate Alternatives

For updated Symposium information, visit www.serdp.org or www.estcp.org or call (703) 736-4548 for assistance. If you are not yet in our mailing database, be sure to subscribe via one of our web sites so you will receive the registration and program brochure that will be released late this summer.

SERDP ESTCP

PARTNERS IN ENVIRONMENTAL TECHNOLOGY TECHNICAL SYMPOSIUM & WORKSHOP
November 30–December 2, 2004

CALL FOR POSTER ABSTRACTS

Both federal and non-federal submissions will be considered.

Abstracts are due August 23, 2004.

A limited number of spaces are available to display poster presentations of technologies that relate to the Symposium & Workshop technical session topics. If you are interested in being considered for poster space, please refer to the abstract guidelines that are posted at www.serdp.org or www.estcp.org.

There is no additional charge for poster space.

S•U•C•C•E•S•S STORIES

SERDP-funded research and development efforts and ESTCP-funded demonstration and validation activities continue to provide a rapidly increasing number of outstanding technical and environmental advances. These developments are highly important and relevant to the Department of Defense (DoD), Department of Energy (DOE), Environmental Protection Agency (EPA), and many other user communities.

SERDP
Strategic Environmental Research and Development Program

SUCCESS STORY

Collaborative Efforts Lay Groundwork for Scientifically Based Copper and Zinc Water Quality Standards

Copper (Cu) and zinc (Zn) have for years been used as primary constituents in ship antifouling paints and coatings, with the result that these metals are prevalent in the sediments below docked ships in harbors. In addition to discharges from DoD facilities, ships, and small craft, many industrial and non-point source effluents also release Cu and Zn into the marine environment. If bioavailable, these heavy metal molecules are toxic to marine organisms. A fundamental understanding of the relationship between sources of Cu and Zn, the concentrations of these metal species, and their bioavailability in aquatic environments is key to properly defining future approaches to regulations that impact the Department of Defense. Traditional water quality measurements use total metal concentration as a metric for regulatory standards. However, studies indicate that total metal concentration may greatly overpredict the toxicity or potential risk to the environment.

SERDP-funded research by three complementary projects is making significant strides in examining the distribution, fate, and toxicity of Cu and Zn in these marine estuaries—San Diego Bay, California; Cape Fear River, North Carolina; and Norfolk Harbor, Virginia. Collectively, the contributions of these projects are laying the groundwork for scientifically based Cu and Zn water quality standards.

Research conducted in the Cape Fear estuary, under the SERDP project *Speciation, Fluxes, and Cycling of Dissolved Copper and Zinc in Estuaries: The Roles of Sediment Exchange and Photochemical Effects (CP-1157)*, has revealed the important role of sediment-water exchange as a source of strong complexing organic or binding compounds (known as ligands) that control the speciation of these two potentially toxic metals in estuarine and harbor environments. Researchers from the University of North Carolina at Wilmington have determined that Cu speciation in some estuaries and harbor environments may be roughly predicted by measuring dissolved organic carbon, a relatively easy to measure parameter. The Cape Fear estuary has a significant excess of very strong Cu-complexing organic compounds relative to the amount of ambient dissolved free Cu. The presence of these ligands suggests that this estuary may be considered relatively "well-buffered" with respect to potentially toxic-free Cu. Researchers have detected some movement of Cu-complexing ligands from sediments into the overlying water column. Most of the strong Cu-complexing ligands are derived from the very small size fraction of the sediment. This observation contrasts with previous observations in less organic-rich estuaries, in which most Cu-complexing ligands were found to be dissolved in the water column. The photochemical reactivity of dissolved Cu and Cu-complexing ligands in the Cape Fear estuary also is being examined. These and other observations suggest that very strongly complexed Cu may not be photoreactive. Weaker complexes may be more photoreactive, resulting in the release of Cu with exposure to sunlight.

Researchers from the University of Wisconsin in Madison are seeking to advance the current understanding of the fate and impact of Cu and Zn as a result of DoD activities at each of the three marine estuaries. Studies conducted through the SERDP project *Speciation, Sources, and Bioavailability of Copper and Zinc in DoD-Impacted Harbors and Estuaries (CP-1158)* have revealed that the amount of Cu uptake in algal cells, a measure of bioavailability, directly correlates to the presence and quantity of Cu-binding complex ligands. The reactivity of Cu and Zn within "pools" or sinks (e.g., sediments) in which these trace metals can accumulate has been characterized using several complementary techniques, including electrochemical and resin-based methods. As a result, the bioavailability of Cu in specific pools was determined with three species of marine algae using both molecular and whole organism bioassays. These bioavailability studies indicate that Cu uptake into algal cells can be accurately predicted from the concentration of strong ligand; therefore, these results

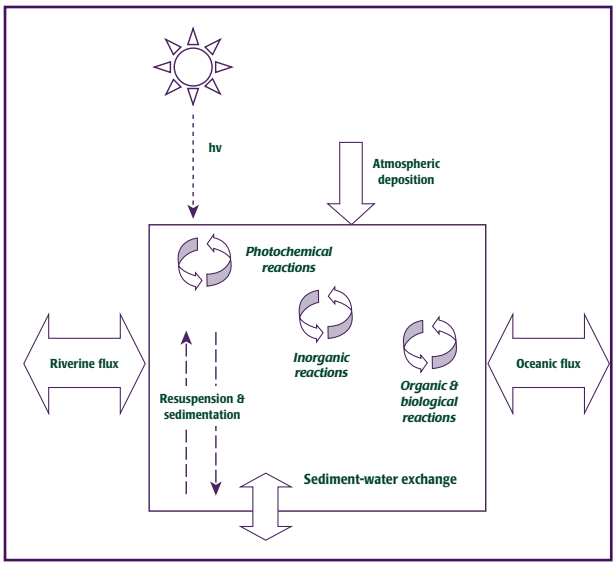
See COPPER AND ZINC, page 3

COPPER AND ZINC, from page 2

strongly support efforts to develop speciation-based water quality criteria for Cu and Zn.

Using data collected by the other two projects, the research team working on the SERDP project *Determining the Fate and Ecological Effects of Copper and Zinc Loading in Estuarine Environments: A Multidisciplinary Approach (CP-1156)* has developed a method for estimating the ecological impact of Cu and Zn loading to estuarine environments, specifically in mixing zones within the San Diego Bay. This effort, led by the Space and Naval Warfare Systems Command (SPAWAR) Systems Center in San Diego, applied a hydrodynamic estuarine model that simulates estuarine topography, tidally driven currents, meteorology, and bottom characteristics. The model was modified to compute water residence times for Cu and Zn species in the estuary, the key physiochemical variable against which all other rate-dependent processes are evaluated. Results indicate a relationship between toxicity and the capacity for ligands to complex with Cu. The results also demonstrate that the distribution of total Cu and complexed Cu is a direct function of the residence time of the water in San Diego Bay; the longer the residence time, the more Cu is complexed with available ligands. Modeling results illustrate that tidal flushing and sedimentation are of roughly equal importance in the overall concentration of total Cu in San Diego Bay.

The collaborative research conducted by these three SERDP projects has resulted in a sampling and analysis protocol for measuring Cu and Zn speciation in estuarine environments. The findings also substantiate that accounting for metal speciation in estuaries will enable a more realistic estimation of acute and chronic risk. The increased fundamental understanding and project-specific results ultimately will lead to the development of scientifically based water quality standards for copper and zinc in the aquatic environment. With these data, the Department of Defense can evaluate its water quality compliance criteria and more accurately assess its potential impact on organisms in the aquatic environment.



Three collaborative SERDP projects are investigating the processes that impact the distribution, fate, and toxicity of copper and zinc in aquatic environments.

For more information about this research, please contact the following individuals: for CP-1157, Dr. Stephen Skrabal, University of North Carolina at Wilmington, at (910) 962-7160 or via e-mail at skrabals@uncwil.edu; for CP-1158, Dr. Martin Shafer, University of Wisconsin-Madison, at (608) 262-0140 or via e-mail at mmshafer@facstaff.wisc.edu; for CP-1156, Dr. Bart Chadwick, SPAWAR Systems Center, San Diego, California, at (619) 553-5333 or via e-mail at bart.chadwick@navy.mil. ◆

EMI WORKSHOP, from page 1

Mr. George Robitaille of the U.S. Army Environmental Center followed with a performance summary of current systems at the Standardized UXO Technology Demonstration Sites. For the remainder of the workshop, presentations and small group discussions focused on sensor development, modeling and data, and signal processing. Within these topic areas, groups summarized the state of the science and engineering, identified current capabilities and technical limitations, and prioritized gaps in understanding. Follow-up discussions encouraged cross-discipline communication to address the issues of system design, operations, and platforms.

The EMI Workshop proved to be a unique forum that promoted discussion, data exchange, and interaction. The diverse backgrounds of the workshop participants provided broad expertise and an array of opinions, helping to identify future research required to improve UXO detection and discrimination. The workshop conclusions will guide SERDP, ESTCP, and the Army's EQT Program in identifying technology needs and areas of future investment and will promote future collaboration to solve this complex and challenging problem.

For additional information about the EMI Workshop, please contact Dr. Anne Andrews, the SERDP and ESTCP UXO Program Manager, at (703) 696-3826 or via e-mail at Anne.Andrews@osd.mil. ◆

SERDP Awards FY 2004 Resear

(Additional information on these newly funded efforts can be found on

CLEANUP

Hydraulic Tomography and High-Resolution Slug Testing to Determine Hydraulic Conductivity Distributions (CU-1367)
Principal Investigator: Carl McElwee/University of Kansas
Spatial changes in hydraulic conductivity are a major factor governing the transport and fate of a pollutant as it moves through an aquifer. The objective of this project is to develop and improve field techniques for better definition of the three-dimensional spatial distribution of hydraulic conductivity by using hydraulic tomography coupled with high-resolution slug testing.

Abiotic Reductive Dechlorination of Tetrachloroethylene and Trichloroethylene in Anaerobic Environments (CU-1368)
Principal Investigator: Elizabeth Butler/University of Oklahoma
To more accurately apply natural attenuation as a remediation measure for chlorinated solvents, a greater understanding of the factors affecting the rates of abiotic reductive dechlorination is needed. This project will develop and apply methods to quantify the rates of abiotic natural attenuation at sites contaminated with tetrachloroethylene (PCE) and trichloroethylene (TCE).

Sustainability of Long-Term Abiotic Attenuation of Chlorinated Ethenes (CU-1369)
Principal Investigator: Michelle Scherer/University of Iowa
While the role of biological processes in the fate of chlorinated ethenes has been studied, little research has been conducted to assess the importance of abiotic chemical processes. This project seeks to identify processes and mechanisms that could potentially account for the abiotic transformation of chlorinated ethenes in contaminated aquifers and to assess their likely importance under field conditions.

Characterization of Contaminant Migration Potential Through In-Place Sediment Caps (CU-1370)
Principal Investigator: Victor Magar/Battelle Memorial Institute
This project will develop improved tools for more cost-effective and efficient cap designs by enhancing the scientific understanding of contaminant transport through sediment caps and the contributions of bioturbation, porewater advection, and sorption. The study will utilize innovative field and laboratory tools, analytical techniques, and numerical modeling.

Integrating Uncertainty Analysis in the Risk Characterization of In-Place Remedial Strategies for Contaminated Sediments (CU-1371)
Principal Investigator: Peter Adriaens/University of Michigan
The purpose of this project is to formulate pertinent relationships and decision criteria with reduced and quantified uncertainty in space and time that will allow better prediction of decision variables, system integrity, and performance of in-place remedial strategies for contaminated sediments. This increased fundamental understanding of processes and uncertainties and their impact on remedial technologies will enable higher cost efficiency and reliable protection.

Anaerobic Biostimulation for the In Situ Precipitation and Long-Term Sequestration of Metal Sulfides (CU-1373)
Principal Investigator: Mary DeFlaun/GeoSyntec Consultants, Inc.
Cost-effective technologies for the remediation of heavy metals are critically needed. This project will investigate an in-situ strategy for precipitating arsenic and potentially other heavy metals as stable metal sulfides and will demonstrate long-term sequestration of these metals under changing geochemical conditions.

Environmental Fate and Exposure Assessment for Arsenic in Groundwater (CU-1374)
Principal Investigator: Janet Hering/California Institute of Technology
The objectives of this project are to 1) develop a conceptual model for arsenic (As) attenuation in the subsurface environment that can be coupled with site characterization to demonstrate that attenuation processes are operative at a given site, 2) establish methods for demonstrating As sequestration, 3) perform a laboratory investigation of strategies for augmenting natural As sequestration, and 4) apply this paradigm for assessment of the environmental fate of and exposure to As at two DoD sites chosen to represent situations where As was either introduced or mobilized by human activities.

Reduced Iron Sulfide Systems for Removal of Heavy Metal Ions from Groundwater (CU-1375)
Principal Investigator: Kim Hayes/University of Michigan
In-situ abiotic/biotic permeable reactive barrier (PRB) systems offer great potential for the cost-effective removal of heavy metal ions from contaminated groundwater. The objective of this project is to evaluate the effectiveness of iron sulfide for simultaneous sequestration of arsenic and cadmium in PRB applications.

Enhancement of In Situ Bioremediation of Energetic Compounds by Coupled Abiotic/Biotic Processes (CU-1376)
Principal Investigator: Jim Szecsody/Pacific Northwest National Laboratory
New technologies are needed to accelerate natural attenuation processes and remediate energetic compounds such as 2,4,6-trinitrotoluene (TNT), hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX), and octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX). This project seeks to stimulate degradation of energetic compounds by abiotically creating an iron-reducing environment to promote initial abiotic transformations followed by subsequent microbial degradation of the transformed energetic products.

Biodegradation of Nitroaromatic Compounds by Stimulating Humic Substance- and Fe(III)-Reduction (CU-1377)
Principal Investigator: Kevin Finneran/GeoSyntec Consultants, Inc.
Based on their solubility at low concentrations, energetic compounds pose a threat to soil, sediment, and groundwater. The objective of this project is to investigate a strategy for anaerobically degrading RDX by stimulating iron(III)- and humics-reducing microorganisms in situ.

Groundwater Chemistry and Microbial Ecology Effects on Explosives Biodegradation (CU-1378)
Principal Investigator: Mark Fuller/Shaw Environmental & Infrastructure, Inc.
Military training activities have resulted in contamination of soil, sediment, and groundwater with nitroaromatic and nitramine explosive compounds. The goal of this project is to develop a better understanding of how environmental conditions affect the biotransformation and biodegradation of TNT, RDX, and HMX in groundwater and to examine how these variables affect the composition and functioning of the indigenous microbial communities.

COMPLIANCE

Airborne Weapons Noise Prediction Model (CP-1397)
Principal Investigator: Micah Downing/Wyle Laboratories
A new computer model is needed to estimate the combination of aircraft noise and elevated weapon noise that occur in air gunnery operations in order to assess the potential for community and environmental impact. This project seeks to 1) characterize the noise generated by airborne weapon systems, 2) evaluate and refine current weapon noise propagation algorithms for airborne platforms, and 3) incorporate these refined algorithms and additional input requirements into the new noise model simulation (NMSim) being developed under SERDP project CP-1304.

Prediction Model for Impulsive Noise Impacts on Structures (CP-1398)
Principal Investigator: Kenneth Plotkin/Wyle Laboratories
Existing models for predicting damage and rattle from noise impulses need to be improved with knowledge of blast waveforms and the probability of damage. These models must be exercised to develop more precise guidelines that will protect facilities for training purposes and minimize restrictions on their use. The objective of this project is to provide trainers, facility and operations planners, and environmental specialists with tools for assessing the potential for damage and rattling of building components when exposed to impulsive noise signatures generated by military operations.

CONSERVATION

Predictive Spatial Analysis of Marine Mammal Habitats (CS-1390)
Principal Investigator: Andrew Read/Duke University
Currently, there are no analytical tools with which to predict the distribution of marine mammals at spatial and temporal scales of relevance to Navy training exercises. Researchers will work to 1) develop and test the robustness of existing and novel spatio-temporal models of marine mammal distribution, as predicted by physical conditions of the marine environment; 2) design a novel, hierarchical framework for analyzing marine mammal distributions across

annual, seasonal, and synoptic time frames; and 3) assemble a spatial decision support system that allows Navy users to analyze model outputs and ancillary oceanographic data across multiple forecasting time scales.

Predictive Modeling of Marine Mammal Density from Existing Survey Data and Model Validation Using Upcoming Surveys (CS-1391)
Principal Investigator: Jay Barlow/National Oceanic & Atmospheric Administration, Southwest Fisheries Science Center
The Navy needs the ability to estimate the density of marine mammals within their operational areas in order to conduct Environmental Assessments and to comply with environmental regulations. This project seeks to develop spatially explicit models based on environmental variables to improve the ability to estimate cetacean abundance in small geographic areas and better guide the location of Navy activities.

POLLUTION PREVENTION

Synthesis, Evaluation, and Formulation Studies in New Oxidizers as Alternatives to Ammonium Perchlorate in DoD Missile Propulsion Applications (PP-1403)
Principal Investigator: Michael Dewey/ATK Thiokol Propulsion
The objective of this project is to develop environmentally benign solid rocket propellant formulations that do not rely on the use of ammonium perchlorate (AP) as an oxidizer. AP in solid fuel for rockets and missiles is one source of perchlorate found in groundwater and drinking water throughout the United States.

Robust Perchlorate-Free Propellants with Reduced Pollution (PP-1404)
Principal Investigator: David Ciaramitaro/Naval Air Warfare Center, Weapons Division
This project seeks to develop a series of environmentally benign solid rocket propellant formulations incorporating fewer toxic intermediates, containing no AP, and producing less hazardous waste. This series of propellants will perform comparably to existing propellants enabling one-for-one replacement.

Elimination of Redwater from TNT Manufacture (PP-1408)
Principal Investigator: Ross Millar/Qinetiq
This project will develop a process for the manufacture of military grade trinitrotoluene (TNT) that will eliminate the generation of redwater by removing the need for bisulfite treatment. The project also will focus on ways to implement the nitration of dinitrotoluenes to TNT more cleanly to reduce production of the pollutants.

Electroactive Polymers as Environmentally Benign Coating Replacements for Cadmium Plating on High Strength Steels (PP-1411)
Principal Investigator: Dr. Peter Zarras/Naval Air Warfare Center
Because of its unique combination of properties, the DoD uses cadmium (Cd) plating on high strength steel components, fasteners, and connectors. However, Cd is coming under pressure because of its toxicity. The objective of this project is to demonstrate, as a one-year proof-of-concept effort, an environmentally benign alternative to Cd plating on high strength steels using electroactive polymers.

UNEXPLODED ORDNANCE

Model-Based, Robust Methods for UXO Discrimination from Time and Frequency Domain Electromagnetic Induction (UX-1379)
Principal Investigator: Eric Miller/Northeastern University
The effective remediation of military sites containing buried UXO requires that objects posing a threat be distinguished and that those classified as dangerous be characterized in terms of their size, shape, object type, and location prior to removal. This project will transition results from the completed **SE**RDP **E**xploratory **D**evelopment (SEED) project UX-1217 by refining and enhancing the UXO discrimination signal processing algorithms, developing a library of UXO time and frequency domain signatures, and validating the algorithms using data from the laboratory and field.

Advanced UXO Discrimination Using Magnetometry: Understanding Remanent Magnetization (UX-1380)
Principal Investigator: Stephen Billings/University of British Columbia
Advanced discrimination capabilities address one of DoD's most pressing environmental problems—the efficient and reliable identification of UXO without the need to excavate large numbers of non-ordnance items. The objective of this project is to improve UXO discrimination by obtaining a better understanding of magnetic remanence in UXO and shrapnel.

Handheld UXO Sensor Improvements to Facilitate UXO/Clutter Discrimination (UX-1381)
Principal Investigator: Tom Bell/AETC Incorporated
Technologies that provide new solutions to the diverse detection and discrimination problems of UXO-contaminated sites are needed, such as handheld sensors for areas inaccessible by vehicle or man-portable systems. The goal of this project is to develop an inexpensive, robust method to determine the precise position of a handheld UXO sensor as it is swept about a suspected buried UXO item. This will enable the sensor to be used for reliable UXO/clutter discrimination.

Acoustic Identification of Filler Materials in Unexploded Ordnance (UX-1382)
Principal Investigator: Wesley Cobb/University of Denver
Improved tools are needed to discriminate between UXO and non-hazardous items. This project seeks to improve the discrimination process by utilizing acoustic waves to identify the materials inside sealed UXO.

Improved Analysis Algorithms for UXO Filler Identification (UX-1383)
Principal Investigator: Daniel Holslin/SAIC
In addressing the need for innovative technology that can identify the filler material in recovered unexploded ordnance, this project will investigate, test, and demonstrate advanced data analysis and decision-making algorithms for the PELAN (Pulsed ELemental Analysis with Neutrons) system to facilitate the identification process.

Analysis and Processing of PELAN Data (UX-1384)
Principal Investigator: Kurt Hacker/Naval Explosive Ordnance Disposal Technology Division
Prior to selecting a disposal method for UXO, a determination must be made about the filler material. This project will investigate the use of more effective and reliable algorithms for analyzing the data collected from the PELAN system and classifying UXO items by filler material.

Neutron Spectrometry for Identification of Filler Material in Recovered UXO (UX-1386)
Principal Investigator: Mary Bliss/Pacific Northwest National Laboratory
Researchers will demonstrate that a portable neutron spectrometer, utilizing novel scintillating fiber detectors, is capable of distinguishing between inert and explosive filler material in UXO. Data generated from the project will be used to develop a preliminary design for a specialized, field-capable unit that can determine the contents of recovered, partially exposed, or near-surface UXO.

Seismic Imaging of UXO-Contaminated Underwater Sites (UX-1387)
Principal Investigator: Roland Gritto/Lawrence Berkeley National Laboratory
This project will conduct a proof-of-principle numerical modeling study to demonstrate that seismic imaging and scattering techniques can be used to detect and locate buried UXO at underwater sites. Seismic scattering approaches can be applied to environments, such as underwater UXO sites, in which strong contrasts between a host medium and an embedded anomaly produce reflected fields with strong amplitudes.

Improving Detection and Discrimination of UXO in Magnetic Environments (UX-1414)
Principal Investigator: Yaoguo Li/Colorado School of Mines
UXO discrimination becomes more difficult when sensor data are contaminated with geological noise originating from magnetic soils. This project will address questions regarding a physical understanding of magnetic soils, how to generate useful site characterizations of magnetic properties, and how to use information from the site characterization to process magnetic and electromagnetic data.

TECH NOTES

SERDP and ESTCP Support Interagency Collaboration in NESHAP Development

Since their inception in the 1990s, SERDP and ESTCP have played a leading role in the Department of Defense's initiatives to reduce its use of toxic materials and to establish an active pollution prevention strategy in complying with environmental regulations. For example, researchers have determined new means to reduce air emissions from volatile organic compounds used in paint, adhesives, and cleaners. In response to existing regulations and in anticipation of emerging regulatory issues, SERDP and ESTCP with input from its interagency Technology Thrust Area Working Groups (TTAWG) and ESTCP Review Committees also have been funding numerous efforts to develop, demonstrate, and implement no- and low-hazardous air pollutant (HAP) materials to aid in compliance and to reduce the emissions of air toxics from surface coating operations.

Recently, the Environmental Protection Agency began developing a series of new air toxic regulations, known as National Emission Standards for Hazardous Air Pollutants (NESHAP), that would regulate surface coating operations for 10 industrial source categories. During the NESHAP development process, the DoD demonstrated to the EPA that it would be subject to up to seven of these new regulations as it manufactures and repairs weapon systems and other materials in seven of these industrial source categories. The new NESHAPs were expected to each have different emission limits, and several also would embody different compliance metrics. To compound matters, some DoD weapon systems are comprised of substrates that would be covered by several of these NESHAPs simultaneously. The National Aeronautics and Space Administration (NASA) and the Coast Guard also demonstrated similar difficulties with the proposed NESHAPs.

Working together, the DoD and EPA have concluded that the best solution to the overlapping NESHAP requirements for a single installation and/or on a single weapon system is for the DoD, Coast Guard, and NASA to have a separate NESHAP. The resulting Defense Land Systems and Miscellaneous Equipment *(DLSME)* NESHAP will regulate all surface coating operations that are not already covered by the Aerospace Manufacturing and Rework Facilities and/or the Shipbuilding and Ship Repair NESHAPs. The DLSME NESHAP will apply at "…installations owned or operated by the Armed Forces of the United States (including the Coast Guard and the National Guard of any such State) or the National Aeronautics and Space Administration, or the surface coating of military munitions manufactured by or for the Armed Forces of the United States (including the Coast Guard and the National Guard of any such State)." (40 CFR 63.3881(c)(4)). Currently, surface coating operations of non-munition DoD, Coast Guard, and NASA material that occur on commercial installations will not be covered under the DLSME NESHAP but must comply with the other (up to seven) surface coating NESHAPs.

The combined DoD, NASA, Coast Guard, and EPA project team are working in an unprecedented, collaborative manner seeking innovative ways to meet the joint goal of securing the interests of national defense while safeguarding human health and the environment. At present, data are being collected on surface coating materials and processes for use in developing the emission limits or Maximum Achievable Control Technology (MACT). The data collection and initial analysis phase are expected to be completed in the June 2004 timeframe. Promulgation of the proposed rule is anticipated for the fall of 2005 with promulgation of a final rule one year thereafter. The initial compliance date is expected to be late fourth quarter FY 2009 or first quarter FY 2010.

Meanwhile, the number of SERDP- and ESTCP-funded HAP-related projects has continued to grow, and SERDP and ESTCP Principal Investigators and members of the TTAWGs and Review Committees serve as the liaison for reporting results of these efforts to the NESHAP project team. In the future, SERDP and ESTCP will continue to address forward-looking, high-risk, long-term projects to achieve the goals that will be set forth by future regulations—seeking collaborative interagency partnerships to maximize the impact of their research and technology development efforts.

For more information on SERDP and ESTCP's support of the DLSME NESHAP development, please contact Mr. Charles Pellerin, the SERDP and ESTCP Pollution Prevention Program Manager, at (703) 696-2128 or via e-mail at Charles.Pellerin@osd.mil or Dr. Robert Holst, the SERDP and ESTCP Compliance Program Manager, at (703) 696-2125 or via e-mail at Robert.Holst@osd.mil. ◆

Program Development Update

SERDP

On November 6, 2003, SERDP issued the FY 2005 Solicitation with pre-proposals due no later than January 8, 2004, in response to 21 Core Statements of Need (SON). Of the 211 pre-proposals received, 51% were from industry and 49% from educational institutions. Following a review of the pre-proposals by the SERDP staff, 78 proposers were invited to submit full proposals. These proposals, along with federal proposal submissions, were due on March 4, 2004. Of the 162 proposals received, 53% were from federal organizations, 26% from educational institutions, and 21% from industry.

SERDP **E**xploratory **D**evelopment (SEED) proposals were due February 5, 2004. SEED proposals are designed for high risk, proof-of-principle efforts requiring no more than $100,000 investment. SEED projects last no longer than one year. Of the 40 SEED proposals submitted in response to two SEED SONs, 54% were received from industry, 28% from federal organizations, and 15% from educational institutions. Core proposals will initially go through peer review, and then all proposals will be reviewed by the Technology Thrust Area Working Groups (TTAWG). For additional information about the solicitations listed, please refer to the SERDP web site at www.serdp.org under the *Funding & Opportunities* link.

ESTCP

The FY 2005 ESTCP Call for Proposals and Broad Agency Announcement (BAA) were issued on January 8, 2004. For the private sector and non-DoD federal organizations, pre-proposals were requested under three topics in the Cleanup and Unexploded Ordnance Pillars and were due on March 11, 2004. DoD organizations were requested to submit technology demonstration proposals

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PROGRAM NOTES

S◆E◆R◆D◆P

- **THE FY 2003 ANNUAL REPORT TO CONGRESS** has been published and submitted. This Program Annual Report provides a summary of SERDP's activities and most significant accomplishments during FY 2003, its plans for FY 2004, and new initiatives to be undertaken during the year. The Annual Report is available on the SERDP web site www.serdp.org by selecting Publications & Products under the *General Information* link.
- **QUARTERLY PROGRESS REPORTS** (i.e., the quarter's technical accomplishments, updated completion dates for milestones, and any concerns regarding technical/financial progress) for the third quarter of government FY 2004 are due by July 15, 2004. For assistance, SERDP PIs should contact their Program Manager Assistant.
- **THE SERDP SCIENTIFIC ADVISORY BOARD (SAB)** is scheduled to meet in Arlington, Virginia, September 8-10 and October 13-15 to review primarily FY 2005 New Start proposals.

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- **QUARTERLY PROGRESS REPORTS** (i.e., the quarter's technical accomplishments, updated completion dates for milestones and documents, and any concerns regarding technical/financial progress) for the third quarter of government FY 2004 are due July 15, 2004. For assistance, ESTCP PIs should contact their Program Manager Assistant.

E◆S◆T◆C◆P *(Continued)*

- **REQUESTED FULL PROPOSALS IN RESPONSE TO BOTH THE BROAD AGENCY ANNOUNCEMENT (BAA) AND THE DoD CALL FOR PROPOSALS ARE DUE** to the ESTCP Program Office by 4:00 p.m. EDT on August 12, 2004.
- **NEW PUBLICATIONS NOW AVAILABLE ON THE ESTCP WEB SITE** (www.estcp.org under the *Documents* link)

Cost and Performance Reports:

Cleanup

- *Cyclodextrin-Enhanced In Situ Removal of Organic Contaminants from Groundwater at Department of Defense Sites (CU-0113)*

Compliance

- *Enhanced Biological Attenuation of Aircraft Deicing Fluid Runoff Using Constructed Wetlands (CP-0007)*
- *Aboveground Storage Tank (AST) Leak Detection and Monitoring (CP-0118)*

Pollution Prevention

- *Replacement of Chromium Electroplating on Landing Gear Components Using HVOF Thermal Spray Coatings (PP-9608)*
- *Replacement of Chromium Electroplating on C-2, E-2, P-3, and C-130 Propeller Hubs Using HVOF Thermal Spray Coatings (PP-9922)*

UXO

- *Applications of Synthetic Aperture Radar (SAR) to UXO Delineation (UX-0126)*

PROGRAM UPDATE, from page 6

no later than April 11, 2004, in the Cleanup, Compliance, Pollution Prevention, and Unexploded Ordnance Pillars. Based on a relevancy review, qualified proposers will be asked to submit full proposals by August 12, 2004, for review later in the summer. For additional details on the ESTCP solicitations, please refer to the ESTCP web site at www.estcp.org under the *Opportunities* link. ◆

PARTNERS IN ENVIRONMENTAL TECHNOLOGY

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

INFORMATION BULLETIN

SPRING 2004 NUMBER 19

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Information and ideas for future articles are always welcome. Address comments and suggestions to

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FOR SERDP AND ESTCP

JUNE 2004

June 9-10
SERDP Scientific Advisory Board (SAB) meeting

AUGUST 2004

August 23
Poster abstract submissions due for Partners in Environmental Technology Technical Symposium & Workshop

SEPTEMBER 2004

September 8-10
SERDP Scientific Advisory Board (SAB) meeting

September 20
SERDP Executive Working Group (EWG) meeting

September 28
SERDP Council meeting

RELATED CONFERENCES & EVENTS

June 15-17
Optimization Conference on Accelerating Site Closeout, Improving Performance, and Reducing Costs Through Optimization
Dallas, Texas

For more information, visit: http://clu-in.org/siteopt/siteopt.htm.

June 22-25
Air & Waste Management Association's 97th Annual Conference & Exhibition
Indianapolis, Indiana

For more information, visit http://www.awma.org/ACE2004.

August 1-6
The Ecological Society of America 89th Annual Meeting
Portland, Oregon

For more information, visit http://www.esa.org/portland/.

August 16-19
AFCEE Technology Transfer Workshop and Joint Services Environmental Management (JSEM) Conference and Exhibition
San Antonio, Texas

For more information, visit http://www.afcee.brooks.af.mil/products/techtrans/workshop/generalinfo.asp.

August 16-19
13th Annual Integrated Training Area Management (ITAM) Workshop
San Francisco, California

For more information, visit http://www.army-itam.com/public/workshop/13th/workshop.jsp.

August 22-27
Department of Defense Conservation Conference
Savannah, Georgia

For more information, visit http://www.dodconservationconference.com.

October 18-21
The 20th Annual International Conference on Soils, Sediments, and Water
Amherst, Massachusetts

For more information, visit http://www.umasssoils.com/, call (413) 545-1239, or e-mail info@UMassSoils.com.

November 30-December 2
Partners in Environmental Technology Technical Symposium & Workshop
Washington, D.C.
Sponsored by SERDP and ESTCP

For more information, visit www.serdp.org or www.estcp.org or call the Symposium Contact Line at (703) 736-4548.

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