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## INSIDE THIS ISSUE

2 New Generation of ISCO Projects Point to Improved Remediation Alternative

3 Marine-Towed Array Identifies Concentrated Areas of Underwater Munitions

4 Partners in Environmental Technology Technical Symposium & Workshop Preliminary Technical Program

5 Workshop Identifies Research, Demonstration, and Management Needs for Southwest TER-S

6 FY 2008 Sustainable Infrastructure Initiatives Under Way

10 Program Development Update

11 New Documents Posted in Online Library

# SERDP and ESTCP Announce Changes in Leadership

After serving 12 years as the Executive Director of SERDP and more than 24 years with the United States Navy, Mr. Bradley Smith is retiring from federal service on June 30, 2008. Mr. Smith has been actively involved in SERDP since its inception. Before joining SERDP and while still on active military duty with the Navy, he served as the Assistant to the Director, Defense Research and Engineering for Environmental Sciences within the Office of the Secretary of Defense. He assumed the duties as Executive Director of SERDP in 1996, and during his tenure has made numerous and significant contributions to the effectiveness and success of the program. While his leadership certainly will be missed, we wish him well in his future endeavors!

**With the retirement of SERDP's Executive Director Mr. Bradley Smith (far left), subsequent changes in SERDP and ESTCP management include the appointment of Dr. Jeffrey Marqusee (second from right) as Executive Director of both SERDP and ESTCP, Dr. Anne Andrews as Deputy Director of both programs, and Dr. Herb Nelson as the SERDP/ESTCP Munitions Management Program Manager.**

The role of Executive Director for SERDP will be filled by the current Director of ESTCP, Dr. Jeffrey Marqusee. Dr. Marqusee will continue as Director of ESTCP and will be supported by

See SERDP/ESTCP LEADERSHIP, page 4

## PARTNERS IN ENVIRONMENTAL TECHNOLOGY TECHNICAL SYMPOSIUM & WORKSHOP

### Meeting DoD's Environmental Challenges

**Sponsored by SERDP and ESTCP**

**December 2–4, 2008**
**Marriott Wardman Park Hotel ✦ Washington, D.C.**

New!

*This year's Symposium & Workshop has been expanded to a **full three-day format** that will offer a more comprehensive technical program featuring **13 technical sessions and five short courses.** Technical sessions will highlight research and innovative technologies that assist the Department of Defense (DoD) in addressing increasingly complex environmental and mission sustainability challenges. Over the course of the three days, short courses on select technologies in the environmental restoration and munitions management areas will offer unique training opportunities on recent advancements in science and technology.*

***For a preliminary list of technical sessions and short courses, refer to page 4.***

### CALL FOR POSTER ABSTRACTS

*Guidelines for poster abstract submissions are posted at www.serdp-estcp.org/symposium. Space will be available to display poster presentations of technologies that relate to SERDP and ESTCP areas of interest. Both federal and non-federal submissions will be considered.*

***Mark Your Calendar: The deadline for submitting poster abstracts is July 31, 2008.***

# Ensuring Effective Remediation via In Situ Chemical Oxidation: A New Generation of R&D Demonstrations

SERDP and ESTCP have embarked on a series of research and development (R&D) and technology demonstration projects to improve the efficacy of remediating chlorinated solvents and other contaminants using in situ chemical oxidation (ISCO). ISCO involves injection of oxidants, also known as amendments, into the subsurface where they break down chlorinated organic compounds upon contact into inert materials such as carbon dioxide, chloride, and water. The potential benefits of ISCO include in-situ contaminant destruction, reliability, simplicity (compared to in-situ biological remediation), and relatively low-cost and rapid treatment. These ongoing projects, part of a larger ISCO initiative led by SERDP and ESTCP, comprise a new generation of ISCO R&D and are summarized below. Fact sheets and other technical documents related to these projects are available in the SERDP and ESTCP Online Library (http://docs.serdp-estcp.org).

**Enhanced Reactant-Contaminant Contact Through the Use of Persulfate In Situ Chemical Oxidation (SERDP Project ER-1489) –** Dr. Richard Watts, Washington State University, is investigating the use of persulfate to overcome some of the limitations of other ISCO oxidants. Key objectives of this research include the determination of persulfate decomposition rates mediated by naturally occurring minerals and subsurface solids as well as the reactivity of persulfate with contaminants in subsurface materials.

**Multiscale Experiments to Evaluate Mobility Control Methods for Enhancing the Sweep Efficiency of Injected Subsurface Remediation Amendments (SERDP Project ER-1486) –** Dr. John McCray, Colorado School of Mines, is working to understand and quantify polymer-induced improvement in the sweep efficiency of chemical oxidants for various subsurface scenarios. The knowledge gained will be applied to hypothetical field conditions using predictive models and will test the compatibility of selected polymers and chemical oxidants.

**Control of Manganese Dioxide Particles Resulting from In Situ Chemical Oxidation Using Permanganate (SERDP Project ER-1484) –** Dr. Michelle Crimi-Martin, East Tennessee State University, is evaluating the transport of manganese dioxide $MnO_2$ particles in groundwater through porous media under a variety of reaction conditions. This research will determine if reaction conditions can be manipulated to stabilize and control manganese dioxide particles to avoid potential loss of subsurface hydraulic conductivity attributable to particle deposition during in-situ permanganate oxidation.

**Development of a Design Tool for Planning Aqueous Amendment Injection Systems (ESTCP Project ER-0626) –** Dr. Robert Borden, North Carolina State University, is developing a series of spreadsheet-based tools to assist remediation engineers in designing effective, reasonably efficient systems for distributing aqueous amendments for in-situ treatment of groundwater contaminants. Primary applications for the tools will include the design of ISCO systems using permanganate and in-situ anaerobic bioremediation systems using soluble substrates and emulsified oil. The Final Report and a User's Guide for this project will be available in late 2009.

**Using Electrical Resistivity Imaging to Evaluate Permanganate Performance During In Situ Treatment of an RDX–Contaminated Aquifer (ESTCP Project ER-0635) –** Dr. Steve Comfort, University of Nebraska, seeks to demonstrate that permanganate amendments can effectively remediate RDX-contaminated groundwater via ISCO. To better define permanganate's performance and area of influence, electrical resistivity imaging (ERI) is being used to delineate permanganate plume development, movement, and temporal changes in permanganate concentrations in groundwater.

**In Situ Chemical Oxidation for Groundwater Remediation: Technology Practices Manual (ESTCP Project ER-0623) –** This project, led by Dr. Robert Siegrist of the Colorado School of Mines, convened a technology practices workshop in March 2007 and initiated development of a Technology Practices Manual (TPM) that will enable more predictable, cost-effective ISCO application. Completed are a review and analysis of existing ISCO knowledge and experience base as well as development of the ISCO TPM framework, including a preliminary Frequently Asked Questions section, a draft design protocol, and a number of interactive ISCO tools. The Final Report and the Technology Practices Manual for this project will be available in early 2009. ◆

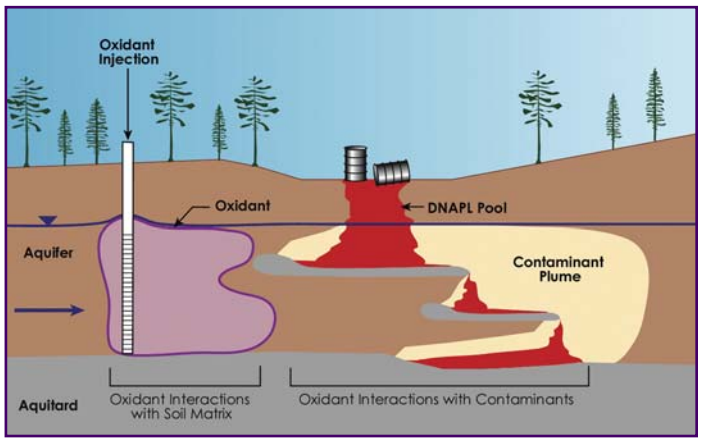


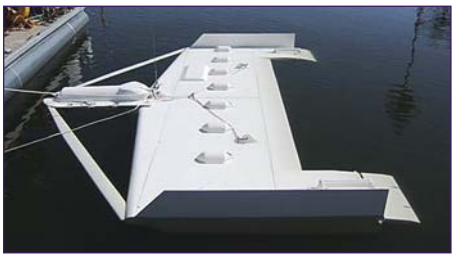

Photo by GeoSyntec Consultants

**Application of ISCO at the Field-Scale**

# Into the Water: Marine-Towed Array Rapidly Identifies Concentrated Areas of Munitions at Underwater Sites

As a result of past military training and weapons testing activities, munitions are present at thousands of current and former Department of Defense sites encompassing millions of acres. This inventory includes hundreds of sites in underwater environments. While modern geophysical surveying techniques can be used effectively to characterize sites potentially contaminated with munitions on dry land, the environment in ponds, lakes, rivers, estuaries, and coastal ocean areas restricts access to and may significantly impact the performance of established and emerging characterization technologies. Volatile aqueous environments present unique challenges for deployment, control, and geolocation of sensors. Further, environmental concerns and safety considerations often restrict the use of common munitions recovery and demolition technologies underwater. In the past few years, SERDP and ESTCP have devoted significant resources and effort to addressing DoD's underwater munitions detection and remediation needs. The marine-towed array (MTA) represents the first major technological advance to emerge from this effort targeting underwater munitions.

With support from SERDP and ESTCP, the marine-towed array has evolved from a research sensor design to a system that now can be applied on live sites to locate underwater munitions. Dr. Jim McDonald from SAIC designed the MTA for underwater munitions detection and discrimination under SERDP project *Technology Needs for Underwater UXO Search and Discrimination (MM-1322)*.

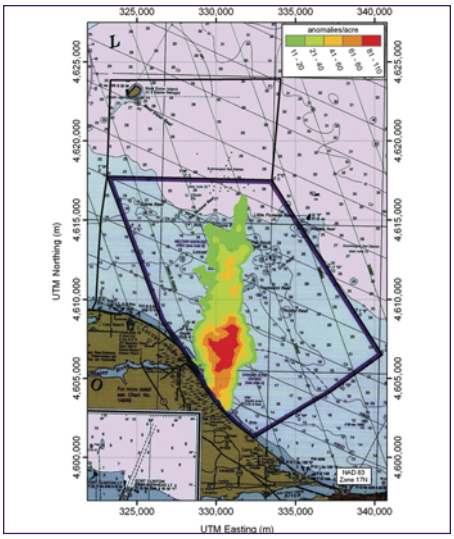


**To identify concentrated areas of munitions, the marine towed array is submerged to survey 1 m above the marine bottom surface.**

Many system components developed for the airborne Multi-Sensor Towed Array Detection System were adapted for the MTA, including the data acquisition and pilot guidance systems, magnetometer sensors, navigation control and attitude sensors, and data analysis algorithms. A study also was completed under this SERDP MTA project to define the deployment concept and develop engineering design plans for the sensor array platform and the vessel-sensor platform interface.

In 2003, Dr. McDonald fabricated a prototype MTA from the model design and performed field demonstrations under ESTCP project *UXO Detection and Characterization in the Marine Environment (MM-0324)*. The resulting 5-m wide towed array platform hosts eight cesium vapor magnetometers with a horizontal spacing of 0.6 m. The sensor platform is designed to operate at and maintain a fixed altitude (nominally approximately 1 m) above the bottom surface. The prototype system was designed to operate in calm conditions in water depths between 1.25 and 5 m. It has proven to be effective up to depths of 7.5 m. Pitch, depth, and roll are maintained by active control surfaces on the platform. During the platform's fabrication, the design team used commercial off-the-shelf products when possible to reduce costs and promote efficiency. In total, the technology includes data acquisition and pilot guidance systems, cesium vapor magnetometer sensors, a GPS-based positioning system, three-dimensional data analysis algorithms and software, and output graphics and GIS-compatible interfaces.

The prototype MTA first was demonstrated at the Former Duck Naval Target Facility, North Carolina. In recent years, demonstrations have followed at Ostrich Bay, Washington, off Puget Sound; the former Erie Army Depot at the mouth of the Toussaint River, Ohio; Vieques, Puerto Rico; Culebra, Puerto Rico; and most recently Blossom Point, Maryland.




**Estimate of the extent and density of munitions contamination in Lake Erie as determined statistically from marine-towed array transect data.**

For all of these surveys except Duck, the objective was to locate concentrations of munitions and characterize the nature and extent of the contaminated areas. The MTA surveys were conducted as a series of statistically planned, evenly spaced sampling paths, or transects, to rapidly assess large areas. Anomalies with signatures contained within the 5-m survey track were analyzed to determine if their size and shape was consistent with munitions. The system has been shown to reliably detect 81-mm mortars or larger items at reasonable probabilities of detection, consistent with identifying concentrated areas of munitions where detection of every item is not required. The primary result of these surveys is a comprehensive and detailed characterization of the munitions present. For example, the figure above shows the extent of the munitions detected and an estimate of the density of items per acre calculated from the Toussaint River demonstration transect data. Estimates of the number of anomalies that would require investigation and the approximate acreage of the impacted area can be used by site managers and regulators to support future planning, prioritization,

See MARINE-TOWED ARRAY, page 4

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### Technical Sessions

- **Monitoring and Mitigation of Vapor Intrusion from Contaminated Groundwater**
- **Recent Advances in Characterization and Remediation of Dense Non-Aqueous Phase Liquid (DNAPL) Source Zones**
- **Management of Contaminated Sediments: The Path to Risk-Based Remedial Action Decisions**
- **Approaches for Managing Contaminated Upland Soils**
- **Military Munitions in the Underwater Environment**
- **Munitions Response: Taking Technology to the Field**
- **Munitions Response: Advances in Science and Systems**
- **Alternative Fuels for DoD Weapons Systems**
- **Replacement of Hexavalent Chromium in DoD Manufacturing and Maintenance Activities: Hard Chrome Plating and Surface Treatments**
- **Replacement of Hexavalent Chromium in DoD Manufacturing and Maintenance Activities: Primers and Sealants**
- **Net Zero Installations: Energy and Beyond**
- **Marine Mammals and Military Operations**
- **Science Underlying the Post-Recovery Management of Listed Species**

### Short Courses

- **Principles and Practices of In Situ Chemical Oxidation**
- **Management of Contaminated Sediments: Capping and Monitored Natural Recovery Approaches**
- **In Situ Bioremediation of Perchlorate in Groundwater**
- **Introduction to Discrimination Methods for Military Munitions Response Projects**
- **Visual Sample Plan Unexploded Ordnance (UXO) Module**

***For details on Symposium & Workshop registration and hotel reservations as well as the latest event information, visit http://www.serdp-estcp.org/symposium or call (703) 736-4548 for assistance.***

**MARINE-TOWED ARRAY**, from page 3

and cost estimation.

The MTA has become a flagship of underwater munitions detection and discrimination and sets a benchmark for underwater survey technology performance. As the munitions response process evolves to address underwater sites, survey technologies such as the MTA will play a critical role. The data products that result will support risk management and ultimately munitions cleanup in this challenging environment. The end goal is to help remediate underwater environments by locating and removing munitions, making them safer for military and civilian alike.

*For additional information, please contact Dr. Jim McDonald, SAIC, Cary, North Carolina, at (919) 653-0215 or Jimmie.R.McDonald@saic.com. Demonstration reports are available in the SERDP and ESTCP Online Library (http://docs.serdp-estcp.org). Reports for recently completed demonstrations will be posted in the coming months.* ◆

**SERDP/ESTCP LEADERSHIP**, from page 1

Dr. Anne Andrews who will assume the role of Deputy Director for both SERDP and ESTCP. Dr. Andrews has been the SERDP and ESTCP Munitions Management Program Manager since 2001. Before joining SERDP and ESTCP, Dr. Andrews was a Research Staff Member at the Institute for Defense Analyses (IDA), Science and Technology Division. Replacing Dr. Andrews as the Program Manager for Munitions Management will be Dr. Herb Nelson. Dr. Nelson joins us from the Naval Research Laboratory where he has been working on unexploded ordnance issues for the past 15 years. During that time, he was the lead principal investigator of several successful SERDP and ESTCP efforts.

Please join us in congratulating both Mr. Smith for his years of leadership and Dr. Marqusee in his expanded role, and in welcoming Dr. Andrews to her new position as Deputy Director and Dr. Nelson to the SERDP and ESTCP management team. ◆

# DoD Identifies TER-S Priorities for Southwest Region

DoD is responsible for managing more than 8.8 million acres of land throughout the Southwest, a region that encompasses the Chihuahuan, Mojave, and Sonoran Deserts and associated embedded and transitional ecosystems. Installations in this region provide critical opportunities for military testing and training. These same installations provide essential habitat for approximately 110 threatened, endangered, and at-risk species (TER-S). Across the region, the aquatic and terrestrial systems on which these species depend have been significantly altered by various anthropogenic stresses that include urbanization, resource extraction, livestock grazing, military activities, and recreational activities. In addition, the region is experiencing a long-term drought that could continue for the next few decades.

To improve regional management of TER-S and their habitats and to sustain military readiness, SERDP, ESTCP, and the Legacy Resource Management Program (Legacy) partnered to sponsor the Southwest Region Threatened, Endangered, and At-Risk Species Workshop held October 22-25, 2007, in Tucson, Arizona. More than 65 federal and non-federal field managers, academic researchers, state natural resource personnel, and representatives from various local conservation organizations participated in the event. The workshop was the third in a planned series of regional TER-S workshops recommended at a June 2005 national symposium addressing TER-S on DoD and adjacent lands.

**As part of the Southwest Region TER-S Workshop, participants toured Fort Huachuca where they not only learned about the installation's natural resource management efforts, but also how it serves as a long-term monitoring site for the Hummingbird Monitoring Network. This monitoring program seeks to understand the biology, population status, and migration attributes of hummingbirds in the region, such as the broad-billed hummingbird (lower left), to conserve these species and their habitat.**

Specific objectives of this regional workshop were to (1) assess TER-S management needs within a regional context, with an emphasis on system-level and cross-boundary approaches; (2) assess these approaches for their potential to keep common species common, while recovering or enhancing TER-S populations; (3) assess current understanding of the ecology of arid and semiarid ecosystems—in terms of understanding the dynamics of highly variable and difficult to predict environments that are also subject to periodic long-term drought—and how that affects or should affect management approaches; (4) examine the current state of practice within DoD for such holistic approaches; (5) identify gaps in knowledge, technology, management, and partnerships that, if addressed, could improve implementation of system-level and cross-

**See TER-S WORKSHOP, page 10**

# Spotlight on SERDP and ESTCP FY 2008

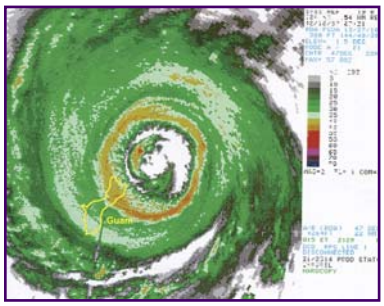
***Throughout 2008, new initiatives in all SERDP and ESTCP focus areas***

SERDP and ESTCP initiatives in **Sustainable Infrastructure** (SI) focus on the science and technologies required to sustain military training and testing areas as well as the natural and cultural resources and built infrastructure that support these areas and deployed forces. In 2008, SERDP research and development efforts are investigating methods to manage and restore dry forest Pacific Island ecosystems; assess impacts of military activities and invasive species on Pacific Island aquatic systems; characterize air emissions from prescribed burning; facilitate renewable energy technology through scalable power grid development; and produce electricity from waste heat for deployed forces. **SE**RDP **E**xploratory **D**evelopment (SEED) efforts are focused on developing innovative approaches for non-destructive sensing and analysis of the integrity of historic buildings and structures. ESTCP investigators are demonstrating technologies to improve energy efficiency and generate renewable energy for DoD installations; increase the understanding of soil erosion on DoD installations, including its impacts on water quality and on range sustainability; prevent leaks from piping through non-invasive assessment of leak potential in DoD fuel storage facilities; and reduce solid waste generated from military food packaging. Collectively, the results from these projects will help DoD in its ongoing efforts to achieve sustainability.

## SERDP Research

### Understanding the Role of Typhoons, Fire, and Climate on the Vegetation Dynamics of Tropical Dry Forests: Looking to the Past to Develop Future Management Solutions (SI-1644)

Principal Investigator: Jeffrey Donnelly/Woods Hole Oceanographic Institution



The objective of this project is to conduct geophysical surveying and coring of sediments and reconstruct the history of vegetation change and typhoon landfall to understand the history of ecosystem change on the island of Guam. The results will be used to assess the role of typhoons in ecosystem changes and ultimately will provide essential data to inform dry forest restoration and management activities throughout the tropical Pacific.

### The Potential for Restoration to Break the Grass/Fire Cycle in Dryland Ecosystems in Hawaii (SI-1645)

Principal Investigator: Susan Cordell/U.S. Forest Service, Institute of Pacific Islands Forestry

The objective of this project is to combine newly-developed remote sensing approaches with field-based studies to characterize the current condition of and historical changes to tropical dry forest ecosystems in Hawaii, to develop approaches for breaking the non-native grass/fire cycle, and to develop technology that can assist in regional restoration planning and ecosystem monitoring. Land managers will be able to use the technologies/methodologies developed to improve fire forecasting, restoration, and fuel management efforts, enabling DoD to meet mission readiness and environmental stewardship responsibilities in Hawaii and the Pacific Islands.

### Development and Use of Genetic Methods for Assessing Aquatic Environmental Condition and Recruitment Dynamics of Native Stream Fishes on Pacific Islands (SI-1646)

Principal Investigator: Michael Blum/Tulane University

This project consists of two interdisciplinary genetic studies focusing on native fishes of the Hawaiian Islands that will provide a sound basis for using genetic approaches to assess the condition of Pacific Island streams. This work will enable the use of innovative methods for assessing the condition of Pacific Island streams and offer practical recommendations for DoD resource managers as they consider archipelago-scale processes and local conditions in setting management and restoration priorities.

### Characterization of Emissions and Air Quality Modeling for Predicting the Impacts of Prescribed Burns at DoD Lands (SI-1647)

Principal Investigator: Mehmet Odman/Georgia Institute of Technology

The objective of this project is to develop a simulation framework that can accurately predict the impacts of prescribed burns on 2.5 micron particulate matter (PM2.5) and ozone levels in the southeastern U.S. This enhanced simulation framework will make it possible to accurately predict the air quality impacts of prescribed burns and enable DoD land managers to plan their operations to ensure the least possible impact to regional air quality.

### New Tools for Estimating and Managing Local/ Regional Air Quality Impacts of Prescribed Burns (SI-1648)

Principal Investigator: Wayne Miller/University of California, Riverside

The objectives of this project are to improve the ability to model the impacts of prescribed burning on local and regional air quality through improvements in characterization of fuel type, loading, and consumption estimates across a

variety of southwestern United States fire-adapted ecosystems; air emission characterization under both flaming and smoldering conditions; and comparing the effects of prescribed burning and wildfires in terms of the impacts to local and regional air quality. The improved smoke management forecasts resulting from this research will reduce the number of DoD-prescribed burns that are inappropriately cancelled or not permitted and help minimize the time and costs associated with managing wildfire risk and preserving fire-dependent species on DoD training ranges.

### Advanced Chemical Measurements of Smoke from DoD-Prescribed Burns (SI-1649)

Principal Investigator: Timothy Johnson/Pacific Northwest National Laboratory

The goal of this project is to provide DoD and civilian smoke managers with the best possible measurements of fuel consumption and emission factors for a broad suite of gases and particulate species emitted by prescribed fires on eastern United States DoD sites, enabling more accurate smoke management decisions. Both laboratory and field burns will be conducted to measure emission factors, and the information will be used to update AP-42 (1995, Compilation of Air Pollutant Emission Factors, EPA) and to drive state-of-the-art dispersion models that estimate downwind concentrations.

### Modeling and Simulation of a Distributed Generation-Integrated Intelligent Microgrid (SI-1650)

Principal Investigator: Saifur Rahman/Virginia Polytechnic Institute and State University

This project seeks to model and analyze a conceptual specialized microgrid, the Intelligent Distributed Autonomous Power System (IDAPS), under normal and power outage conditions. Ultimately, the IDAPS control model will help remove certain barriers in the interconnection and control of distributed energy resource units in a microgrid environment and facilitate the use of cleaner, greener, and more efficient distributed energy resources, as well as offer DoD installations the ability to provide energy security to critical loads during grid outages.

### Efficient Thermoelectric Power Conversion of Waste Heat for Deployed Forces (SI-1651)

Principal Investigator: James Caylor/RTI International

The objective of this project is to apply thermoelectric power generators to multiple DoD waste heat producers (e.g., diesel generators) to recover waste heat and convert it to useful electrical power on a large enough scale to improve fuel and energy savings for deployed forces. The application of this technology will lower the fuel burden on the armed forces by producing more efficient power via co-generation with diesel generators.

### Advanced Soldier Thermoelectric Power System for Power Generation from Battlefield Heat Sources (SI-1652)

Principal Investigator: Terry Hendricks/Pacific Northwest National Laboratory

This project intends to develop a lightweight, small form-factor, soldier-portable advanced thermoelectric (TE) system prototype to recover and convert waste heat from a variety of deployed equipment to provide power for soldier battery charging, advanced capacitor charging, and other battlefield power applications. Ultimately, the portable TE system will achieve technology readiness level (TRL) 6, with power levels up to 500 watts, thereby helping satisfy the large and growing power requirements for various U.S. Army and Marine battlefield equipment.

### Assessment of Historic Masonry and Concrete Structures by Broadband Vibration Testing (SI-1653)

Principal Investigator: Thomas Boothby/The Pennsylvania State University

The objective of this project is to develop an effective means to construct accurate analytical models for historic structures on DoD installations that will eventually result in more accurate structural assessments. Experimental modal analysis and impact echo methods (both successfully demonstrated) will be combined into one device that will allow end users to make rapid assessments of the condition of historic concrete and masonry structures.

### Performance-Based Non-Destructive Load Assessment Tools for Historic DoD Buildings and Structures (SI-1654)

Principal Investigator: Chris Inaba/Naval Facilities Engineering Service Center

This project aims to determine the feasibility of a performance-based, non-destructive load assessment system for historical DoD reinforced concrete buildings. The results of this research will provide accurate load capacity calculations for reinforced concrete buildings, thus allowing DoD stakeholders to appropriately formulate strengthening or repair estimates for military construction funding.

### Structural Integrity Assessment Using Laser Measured Surface Vibration (SI-1655)

Principal Investigator: Joseph Bucaro/Naval Research Laboratory

This project aims to further develop fault detection and localization structural assessment techniques by improving inversion algorithms to better characterize physical flaws in historic structures. It also will extend the application of this technique to additional materials and nonplanar geometries. This research will lead to new techniques that can be incorporated into a toolkit of nondestructive methods that DoD installation personnel can use to rapidly and effectively assess the structural condition and integrity of the fabric of historic buildings.

**See FY 2008 SI INITIATIVES, page 8**

# Spotlight on SERDP and ESTCP FY 2008

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## ESTCP Demonstrations

### Building Integrated Photovoltaic Roofs for Sustainability and Energy Efficiency (SI-0813)

Principal Investigator: Peter Ly/Naval Facilities Engineering Service Center

This project aims to demonstrate that Building Integrated Photovoltaic (BIPV) roofing systems are structurally sound, should not leak for 20 years under normal maintenance and repair, and can provide large-scale, on-site renewable energy generation. It will increase the acceptance of this technology through development of a Unified Facilities Guide Specification and Whole Building Design Guidance document. DoD-wide implementation of this technology has the potential to increase energy security, generate renewable energy credits to meet energy goals, decrease energy consumption by reducing building interior cooling loads, reduce greenhouse gas emissions, improve air quality, and lower building life-cycle costs.

### Zero Energy Housing for Military Installations (SI-0814)

Principal Investigator: Richard Sinclair/U.S. Army Installation Management Command Southeast

Zero Energy Homes (ZEH) generate as much power as they consume from the grid through a combination of energy efficient design, use of renewables, and energy conservation practices by the homeowners. The objective of this project is to compare and document the energy, economic, and environmental performance of two ZEHs to two homes with the same floor plan in the same subdivision occupied by similar families.

### Vehicle Dynamics Monitoring and Tracking System (VDMTS): Monitoring Mission Impacts in Support of Installation Land Management (SI-0815)

Principal Investigator: Alan Anderson/U.S. Army Corps of Engineers, Engineer Research and Development Center—Construction Engineering Research Laboratory

The objective of this project is to demonstrate and validate a methodology (developed under SERDP Project SI-1102) to assess the impacts of vehicle-based training on training ranges. The approach and toolset will more accurately characterize mission impacts in a manner that more effectively supports fielding of new weapon systems and maintenance of installation lands at significant cost savings.

### Nanotechnology for the Solid Waste Reduction of Military Food Packaging (SI-0816)

Principal Investigator: Jo Ann Ratto/U.S. Army Natick Soldier Research, Development & Engineering Center

This project will demonstrate and validate new nanocomposite packaging for meals, ready-to-eat (MRE) that meet the operational and performance requirements of combat ration shelf life, replacing the existing combat ration packaging systems and decreasing solid waste. By incorporating multifunctional advanced nanocomposites into MRE packaging, it is estimated that the amount of solid waste generated can be reduced by 20-30%. The nanocomposite packaging is entirely polymeric and potentially recyclable, unlike current MRE packaging.

### Continuous, Wireless Monitoring of Sediment Flux at Multiple Low-Water Stream Crossings on Tank Trails (SI-0817)

Principal Investigator: Gerhard Grimm/U.S. Army Aberdeen Proving Ground

This project will evaluate a new type of sensor for direct real-time measurement of suspended sediment concentrations in streams at military installations and will integrate multiple sensors into a wireless sensor network to enable web-based, installation-wide, remote monitoring of suspended sediment flux and sediment loads. These sensor networks will enable personnel to remotely monitor sediment discharge on a continuous, long-term basis with greater spatial and temporal resolution and at lower costs, enabling installations to more quickly identify sediment problem areas and comply with state and federal Clean Water Act requirements.

# Initiatives in Sustainable Infrastructure

***will be highlighted. Featured here are Sustainable Infrastructure efforts.***

### Demonstration/Validation of Sustainable Energy Production and Use and Environmental Waste Management Using an Innovative Fast Pyrolysis Technology (SI-0818)

Principal Investigator: Manette Messenger/U.S. Army Installation Management Command Southeast

The objective of this project is to demonstrate and validate the performance of a prototype, fast pyrolysis unit in producing BioOil from wood, paper, and fiber wastes that can be used as a boiler or generator fuel and that will lead to cost savings via reduced natural gas use and solid waste disposal. The project will document the environmental performance, energy balance, and product quality from various feed stocks and provide an economic analysis under various operating conditions.

### Ultrasonic Guided Wave Technology for Non-Invasive Assessment of Corrosion-Induced Damage in Piping for Pollution Prevention in DoD Fuel Storage Facilities (SI-0819)

Principal Investigator: John Liu/Naval Surface Warfare Center, Carderock Division

The objective of this project is to demonstrate the use of ultrasonic guided wave technology to detect and track the growth of corrosion-induced material damage in steel piping in DoD fuel storage and transport facilities. Ultrasonic guided wave technology for pipe inspection costs several times less than current techniques, provides information on the rate of material deterioration, and can help prevent fuel spills and potentially costly spill cleanup efforts.

### Validating the Kinematic Wave Approach for Rapid Soil Erosion Assessment and Improved BMP Site Selection to Enhance Training Land Sustainability (SI-0820)

Principal Investigator: Stacy Hutchinson/Kansas State University

The objective of this follow-on project is to run an erosion potential model developed under SERDP Project SI-1339 for additional military installations selected from regions with different precipitation regimes, land cover conditions, topographic characteristics, and soil types, as well as to operate the model in a predictive mode to better assess the impact of military training activities on future gully formation. Using this approach, military installations will gain the capability to quickly evaluate gully formation potential across their training lands, saving significant time normally spent on ground and air surveys while making training safer for soldiers and less damaging to equipment.

### Dewpoint Evaporative Comfort Cooling (SI-0821)

Principal Investigator: Steven Slayzak/National Renewable Energy Laboratory

The objective of this project is to demonstrate the capabilities of new high-performance indirect evaporative cooling technology to enhance energy efficiency and comfort in dry climates while substantially reducing peak demand on the power grid. The project will quantify energy and water consumption, cost savings relative to air conditioners, and improved comfort relative to conventional evaporative coolers. Peak power demand reductions in excess of 20% are expected and will ultimately lead to reduced strain on the grid, increased electric delivery reliability, and reduced projected service expansion costs.

### Liquid-Dessicant Outdoor Air Conditioner for Low-Electricity Humidity Control (SI-0822)

Principal Investigator: Steven Slayzak/National Renewable Energy Laboratory

The objective of this project is to demonstrate the capabilities of new high-performance liquid desiccant-dedicated outdoor air technology to enhance cooling efficiency and comfort in wet climates while substantially reducing peak demand on the power grid. Thermal energy to power the liquid-desiccant air conditioner can be recovered from a variety of sources with recoverable heat between 150°F and 300°F, and air conditioning energy reductions of 25% are expected when using solar or recovered waste heat as the primary energy input.

### Joint Demonstration and Verification of the Performance of Microturbine Power Generation Systems Utilizing Renewable Fuels with the U.S. EPA Environmental Technology Verification Program (SI-0823)

Principal Investigator: Tim Hansen/Southern Research Institute

This project will demonstrate and verify the economic and environmental utility of the Flex-Microturbine®, an advanced waste-to-energy technology that generates electricity from extremely low energy gas. This microturbine uses a proprietary flameless catalytic combustion system that oxidizes and destroys the hydrocarbons found in landfill gases and therefore allows it to operate on gases that are below the typical requirements for combustion, leading to increased energy production from this waste stream.

# Program Development Update

## SERDP

SERDP released its FY 2009 Core Solicitation on November 8, 2007. By the submission deadline of January 8, 2008, the Program Office received 198 pre-proposals in response to 19 Statements of Need (SON). SERDP Staff reviewed these pre-proposals, and by February 1, extended requests for full proposals to the most qualified pre-proposals that met the relevance criterion. Eighty-one full proposals from the private sector and 93 proposals in response to the federal Call for Proposals were received by March 6. In April, these private sector and federal proposals underwent an independent peer review evaluation with a subsequent review in June by the SERDP Technical Committees (STC).

SERDP also released its FY 2009 **S**ERDP **E**xploratory **D**evelopment (SEED) Solicitation on November 8. SEED efforts are high risk and potentially high payoff projects that last no longer than one year and cost less than $150,000, which is an increase from prior years' funding limit of $100,000. Thirteen SEED proposals responding to one SON also were received by the March 6 deadline. These proposals will undergo Staff review and be reviewed in the proposal selection meetings held by the STCs in June.

For further details on the solicitations listed above, please visit www.serdp.org under the *Funding Opportunities* link.

## ESTCP

On January 10, 2008, ESTCP released both an FY 2009 Call for Proposals to non-DoD federal organizations and a Broad Agency Announcement (BAA) for the private sector requesting pre-proposals. The Call for Proposals and BAA solicited pre-proposals in six topics within the Environmental Restoration, Munitions Management, and Sustainable Infrastructure focus areas. Also on January 10, a Call for Proposals was sent to DoD organizations soliciting pre-proposals in the four focus areas: Environmental Restoration, Munitions Management, Sustainable Infrastructure, and Weapons Systems and Platforms. By the March 13 deadline, 91 pre-proposals were submitted from DoD organizations, and 147 pre-proposals were received in response to the BAA. The ESTCP Technical Committees (ETC) will review relevant pre-proposals and recommend that successful proposers submit full proposals in early August for further review by the ETCs in September.

For additional details on all ESTCP solicitations, please visit www.estcp.org under the *Opportunities* link. ◆

**TER-S WORKSHOP, from page 5**

boundary approaches; and (6) prioritize investment opportunities to address these gaps.

The workshop opened with a plenary session consisting of presentations summarizing the sponsoring programs, DoD's Western Regional Partnership, and commissioned white papers on topics that included climate variability and change, Southwest fire ecology, the hydrology and ecology of intermittent stream and dry wash ecosystems, and spatial scale and TER-S management. A subsequent tour of Fort Huachuca enabled participants to view firsthand efforts of the installation to manage TER-S and their habitats so they could better understand the uniqueness of the resources and challenges of implementing natural resource management on a military installation. Through concurrent breakout group discussions, participants identified science and management issues related to patterns of rarity in an ecological system context; ecological processes and their variability in space and time; and cross-boundary monitoring, management, and coordination, as well as opportunities to strengthen DoD partnerships with federal and state agencies, academic institutions, and non-governmental organizations throughout the region.

Priority information gaps and management needs identified at the workshop included (1) fire ecology and impacts of altered fire regimes; (2) impacts of climate variability and change; (3) impacts of non-native invasive species; (4) impacts of fragmentation and habitat reduction; (5) hydrology and ecology of intermittent streams, dry washes, and adjacent riparian zones; and (6) understanding patterns of species and population distributions and rarity. Full proceedings will be available later this summer at www.serdp.org/tes/Southwest.

SERDP, ESTCP, and Legacy are using the workshop discussions and outcomes to help guide their investments for addressing TER-S and their associated ecosystems in the Southwest. Addressing research priorities and using the resulting information to better manage listed and at-risk species offers a significant opportunity to benefit TER-S populations and sustain military testing and training lands. This workshop represents an important step toward a long-term effort for stakeholders to work together to help DoD fulfill its military mission while protecting the valuable resources with which it is entrusted. ◆

## Recent Additions to the Online Library

The following are samples of new publications now available in the SERDP and ESTCP Online Library (http://docs.serdp-estcp.org). Access them by entering the project number (e.g., 0125) under Search Phrase. Other documents may be accessed by entering an appropriate keyword or selecting the relevant search filters.

### Environmental Restoration

- Cost & Performance Report: In-Situ Catalytic Groundwater Treatment Using Palladium Catalysts and Horizontal Flow Treatment Wells (ESTCP ER-0012)
- Final Report: Continuation of the Ecological Risk Assessment of Explosive Residues in Rodents, Reptiles, Amphibians, Fish and Invertebrates: An Integrated Laboratory and Field Investigation Related to Live-Fire Ranges in the Department of Defense (SERDP ER-1235)
- Final Report: Biodegradation of 1,4-Dioxane (SERDP ER-1422)
- Final Report: Demonstration and Validation of a Regenerated Cellulose Dialysis Membrane Diffusion Sampler for Monitoring Groundwater Quality and Remediation Progress at DoD Sites (ESTCP ER-0313)

### Munitions Management

- Cost & Performance Report: Small Area Inertial Navigation Tracking (SAINT) System for Precise Location of Buried UXO (ESTCP MM-0604)
- Final Report: Evaluation of Unexploded Ordnance Detection Technology at the Standardized UXO Test Sites, Aberdeen and Yuma Proving Grounds (SERDP MM-1300 and ESTCP MM-0103)
- Final Report: Sensor Orientation Effects on UXO Geophysical Target Discrimination (SERDP MM-1310)
- Final Report: Modeling for Sensor Evaluation in Underwater UXO Test Beds (SERDP MM-1329)
- Final Report: Feasibility Study for an Autonomous Unmanned Aerial Vehicle (UAV)-Magnetometer System (SERDP MM-1509)
- Final Report: High-Density LiDAR and Orthophotography in UXO Wide Area Assessment (ESTCP MM-0534)
- Technical Report: Application of Statistically Based Site Characterization Tools to the Erie Army Depot and Toussaint River Site for the ESTCP Wide Area Assessment Demonstration (ESTCP MM-0325)

### Sustainable Infrastructure

- Final Report: Emerging and Contemporary Technologies in Remote Sensing for Ecosystem Assessment and Change Detection on Military Reservations (SERDP SI-1098)
- Final Report: Developing an Efficient and Cost-Effective Ground-Penetrating Radar Field (SERDP SI-1261)
- Workshop Report: DoD Southeast Regional Planning & Sustainability Workshop, April 25–27, 2007

### Weapons Systems and Platforms

- Cost & Performance Report: Effect of Biodiesel on Diesel Engine Nitrogen Oxide and Other Regulated Emissions (ESTCP WP-0308)

PARTNERS IN ENVIRONMENTAL TECHNOLOGY

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

INFORMATION BULLETIN

SPRING 2008 NUMBER 34

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## FOR SERDP AND ESTCP

### JUNE 2008

**June 17-19**
Weapons Systems and Platforms (WP) ESTCP Technical Committee (ETC) and SERDP Technical Committee (STC) downselect meetings (closed meetings)

**June 24-25**
Sustainable Infrastructure (SI) SERDP Technical Committee (STC) proposal selection meeting (closed meeting)

**June 26-27**
Environmental Restoration (ER) SERDP Technical Committee (STC) proposal selection meeting (closed meeting)

### JULY 2008

**July 1**
Munitions Management (MM) SERDP Technical Committee (STC) proposal selection meeting (closed meeting)

### AUGUST 2008

**August 7**
Requested full proposals due for ESTCP FY 2009 solicitations

### RELATED CONFERENCES & EVENTS

**July 8-11**
2nd Annual U.S. Army Sustainable Range Program (SRP) Workshop
San Antonio, Texas
*For more information, visit www.ncsi.com/armyrange08/index.shtml.*

**July 13-17**
Society for Conservation Biology 2008 Annual Meeting
Chattanooga, Tennessee
*For more information, visit www.conbio.org/activities/meetings/2008.*

**August 3-6**
GovEnergy 2008
Phoenix, Arizona
*For more information, visit www.govenergy.com.*

**August 3-8**
93rd Ecological Society of America (ESA) Annual Meeting
Milwaukee, Wisconsin
*For more information, visit www.esa.org/Milwaukee.*

**August 12-14**
2008 Department of Defense Explosives Safety Board (DDESB) Seminar
Palm Springs, California
*For more information visit www.ddesbseminar.org.*

**September 22-25**
(events collocated)
San Diego, California
*For more information, visit redoxtech.com.*

- The Sixth International Conference on Oxidation & Reduction Technologies for In-Situ Treatment of Soil and Groundwater
- The Third International Conference on Challenges in Site Remediation: Site Characterization & Performance Monitoring
- The Third International Conference on DNAPL Characterization & Remediation
- The Second International Conference on Contaminated Fractured Rock: Characterization & Remediation
- The First International Conference on Remediation of Soil, Sediment and Groundwater - Biological, Chemical and Physical Treatments: Where We Are Now and Where Are We Going?
- International Conference on 25 Years of TiO2 Photocatalysis – Retrospective and Prospective Views
- The Thirteenth International Conference on TiO2 Photocatalysis: Fundamentals & Applications
- The Fourteenth International Conference on Advanced Oxidation Technologies for Treatment of Water, Air and Soil


INFORMATION
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