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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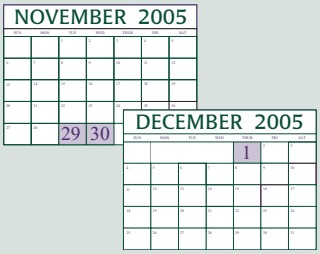
ESTCP Partnership with ITRC Supports Use of Lower Cost Direct-Push Wells for Groundwater Monitoring

The standard for groundwater monitoring wells used to determine the concentration and extent of contaminants in groundwater typically consists of 2- or 4-inch diameter wells that are drilled and installed using a hollow-stem auger (HSA). However, recent advances in direct-push (DP) well technology indicate that this technology may have significant advantages over HSA wells. These advantages include reduced costs, minimal cutting wastes, fewer well-development wastes, more rapid mobilization and installation rates, reduced exposure of workers to contamination, and dynamic hydrologic and contaminant characterization with chemical and lithologic sensors. Yet, in spite of these advantages, there are regulatory barriers to using DP wells for most groundwater monitoring applications in more than 47 states. The ESTCP project *Demonstration/Validation of Long-Term Monitoring Using Wells Installed by Direct-Push Technologies (CU-0011)*, led by the Naval Facilities Engineering Service Center, sought to advance regulatory acceptance for DP wells as an alternative to conventionally drilled wells.

DP wells are installed using a hydraulic or percussion instrument to drive the well screen and riser into the subsurface to the desired depths. Conventional wells are installed using an HSA to drill a borehole of a specified depth first, and then install a metal well casing with screened intervals at the depth where

See DIRECT-PUSH WELLS, page 3



PARTNERS IN ENVIRONMENTAL TECHNOLOGY TECHNICAL SYMPOSIUM & WORKSHOP

"Meeting DoD's Environmental Challenges"

November 29–December 1, 2005
Marriott Wardman Park Hotel ✦ Washington, D.C.
Sponsored by SERDP and ESTCP

This year's technical program will feature comprehensive sessions that illustrate how SERDP and ESTCP research & development and demonstration & validation efforts are assisting the Department of Defense (DoD) to address increasingly complex environmental challenges. The preliminary list of technical sessions includes the following:

- Sustainable DoD Facilities and Communities
- Health & Environmental Impacts of Nanotechnologies
- Environmentally Benign Corrosion Protection Technologies
- Green Energetics
- Managing Threatened and Endangered Species (TES) for DoD Sustainability
- Marine Mammals and Military Operations
- Management Options for Chlorinated Solvents
- Metals Bioavailability and Risk Assessment
- Perchlorate Remediation and Treatment
- Phytoremediation Technologies
- Wide Area Assessment of Unexploded Ordnance (UXO)
- Emerging Detection and Discrimination Technologies for UXO

Online registration is now available, and a block of hotel rooms has been set aside for attendees at the per diem rate. For details on registration and hotel reservations as well as the latest conference information, visit www.serdp.org or www.estcp.org or call (703) 736-4548 for assistance.

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

Alternatives to Perchlorate Reduce DoD's Future Liabilities

Pyrotechnic flares are used throughout DoD in a variety of applications. Signal flares direct troops in the field and provide illumination for operations at night whereas decoy flares in aircraft serve as countermeasures against missile attacks by simulating the aircraft's spectral signature to draw away infrared-guided missiles. The functions of these two flares are vital to military operations. Unfortunately, many of the current pyrotechnic formulations used in these flares contain perchlorate oxidizers. The high solubility of perchlorate coupled with its chemical stability in water leads to persistent groundwater contamination. Effective alternatives for perchlorate are needed to reduce future liabilities for the Department of Defense.

For the past several years, SERDP has funded the development of replacements for perchlorate in DoD energetic formulations for pyrotechnics. Dr. Robert Shortridge, Naval Surface Warfare Center–Crane Division, is leading the SERDP project *Elimination of Perchlorate Oxidizers from Pyrotechnic Flare Compositions (PP-1280)*. Through this effort, Dr. Shortridge has focused on the re-formulation of red and green signal flares and decoy flares. These new formulations consist of oxidizers, such as metal nitrates and oxides, high-energy metal, and/or alloy fuels, to

SERDP is developing perchlorate-free flares for DoD applications.

offset the energy shortfall caused by the elimination of perchlorate oxidizers. By using these alternative ingredients, this project has developed pyrotechnic compositions that will be free of perchlorates and match or exceed the performance of existing flares in service.

Three red signal flare composition candidates have been identified through laboratory-scale formulation optimization. Each formulation is 100% chlorine free. The new compositions contain mixtures of strontium nitrate and calcium nitrate oxidizers, as well as a curable epoxy binder system. While all three have magnesium as the principal fuel, one candidate contains an aluminum-magnesium ($Al_{0.5}Mg_{0.5}$) mechanical alloy developed by the New Jersey Institute of Technology, and the third candidate contains commercial magnalium alloy. In addition to undergoing thermal analysis, each composition was subjected to safety-related testing for impact, friction, and electrostatic ignition sensitivity. The candlepower intensity, dominant wavelength, and color purity also were measured during performance tests. All three candidates performed as well as the in-service red flare composition and are therefore considered ideal replacement candidates. The three red flare candidates are currently in the process of being scaled up to the Navy's Mk 124 Mod 0 Marine Smoke and Illumination Signal.

Similar composition optimization studies were conducted with green signal formulations. As a result, two candidate compositions were scaled up. One consisted of magnesium fuel, barium nitrate oxidizer, the minimum necessary amount of polyvinyl chloride (PVC) color enhancer, and the epoxy binder system. The second candidate also contained small amounts of three supplementary fuels, including the $Al_{0.5}Mg_{0.5}$ mechanical alloy. As with the red formulations, the green flare scale-up candidates were subjected to thermal analysis, ignition sensitivity, and performance tests. These tests clearly showed the distinct green color produced by both the in-service green flare composition and the two scale-up candidates. Color purity and dominant wavelength of the two candidates met or exceeded the values produced by the in-service green flares, making them ideal replacement candidates. Efforts are under way to secure safety approval for scale up of these two green candidate compositions to replace the in-service Mk 117 Marine Smoke and Illumination Signal.

In addition to the red and green flares, Dr. Shortridge investigated alternative formulations to decoy flares. Again, utilizing chemical equilibrium modeling in a formulation optimization

See PERCHLORATE ALTERNATIVES, page 9

groundwater samples will be taken. State regulations cite requirements for a minimum 2-inch annular space (the space between the metal well casing and the drilled borehole) and well filter packs as primary reasons for restricting the use of DP wells. In recent years, the DP well industry has made significant efforts to improve well sealing methods and pre-pack sand filter technologies, as well as develop American Society for Testing and Materials (ASTM) standards for well construction and installation. Well design specifications (e.g., filter pack and well screen slot size) now can be based on DP soil classification results, allowing for rapid custom well design and installation during a single site deployment. While some states accept the current DP technology and routinely allow unrestricted use through regulatory variances, others strictly adhere to annular space requirements that DP technology can not meet. These diverging opinions led to the need for a comprehensive comparison of DP and HSA wells with nationwide regulatory review and concurrence.

To perform this comparison, ESTCP funded a multiyear demonstration of several monitoring well designs at four Army, Navy, and Air Force sites to determine the potential effectiveness of DP wells for long-term monitoring of groundwater. The 98-well investigation is being conducted on four contaminant plumes in California, Delaware, Florida, and New Hampshire, representing a variety of geologic conditions as well as a cross-section of regulatory domains. Investigators installed DP wells in clusters adjacent to, and paired with, existing HSA drilled wells. A rigorous sampling effort established a database of water quality and chemical analytical results, comparing samples from both well types over 13 quarterly sampling events.

Direct-push well technology can be installed using current state-of-the art methods.

Analyses to date show that groundwater contaminant data collected from DP-installed monitoring wells are statistically comparable to contaminant data collected from conventional HSA-installed wells. Where statistically significant differences exist, there is no trend that would indicate a performance difference between DP- and HSA-installed wells, and management decisions based on these contaminant concentrations would not differ, regardless of the well type. In a parallel demonstration, a comprehensive hydraulic conductivity comparison was conducted in DP and HSA wells located at one of the California test cells. Results indicate that DP wells provide hydrologic data that is comparable to conventional HSA-drilled wells.

ESTCP investigators presented these interim results to the Interstate Technology & Regulatory Council (ITRC), a state-led coalition of federal organizations, industry participants, and other stakeholders that works to achieve regulatory acceptance of innovative environmental technologies. ITRC's Sampling, Characterization, and Monitoring (SCM) team agreed to produce a "Tech Reg" document and to review and provide input to the ESTCP project. More than 14 state regulatory members, DOE, DoD, industry, and stakeholders reviewed the ESTCP study, DP well regulations, and the state-of-the-art DP well technology. The SCM team then surveyed all states for current DP regulations and general attitudes toward the use of DP wells for long-term monitoring applications, and industry vendors were invited to review and provide input to the Tech Reg document. The SCM team also performed comprehensive assessments of the advantages and limitations of the DP well technology (e.g., consolidated aquifers and very deep wells). The Direct Push Tech Reg document, currently in final review, will provide unbiased technical performance information on the applicability of DP wells, allowing individual states to make informed decisions on their use for groundwater monitoring. ESTCP investigators also have partnered with the ITRC SCM team to produce follow-on Internet training modules that will be offered to a worldwide audience this fall.

The active involvement of ITRC throughout this ESTCP project and the resulting Tech Reg document are expected to increase regulatory acceptance of DP wells for long-term monitoring of groundwater at DoD sites. Costs for monitoring well installation typically represent a significant portion of remediation and monitoring budgets. When compared to conventional HSA well installation, the cost of installing DP wells is about 50% less for shallow wells and 75% less for deep wells. As there are thousands of DoD hazardous waste sites with anticipated cleanup and monitoring requiring billions of dollars, significant cost savings are expected through widespread implementation of DP wells for groundwater remedial actions and long-term monitoring.

For further information, please contact Mr. William Major, U.S. Navy, Naval Facilities Engineering Service Center, at (805) 982-1808 or via e-mail at william.major@navy.mil. ◆

ESTCP Awards FY 2005 Demons

(Additional information on these newly funded efforts can be found

CLEANUP

Validation of Chlorine and Oxygen Isotope Ratio Analysis to Differentiate Perchlorate Sources and to Document Perchlorate Biodegradation (CU-0509)
Principal Investigator: Paul Hatzinger/Shaw Environmental and Infrastructure, Inc.
A number of sites have been identified for which military or commercial sources of perchlorate contamination in groundwater are unlikely. This project will provide DoD with a scientific assessment of the contribution of natural perchlorate to environmental contamination, a validated forensic technique for distinguishing military from natural perchlorate, and a new method to document perchlorate biodegradation in the field.

Field Testing of Activated Carbon Mixing and In Situ Stabilization of PCBs in Sediment (CU-0510)
Principal Investigator: Richard Luthy/Stanford University
This project will demonstrate and validate an innovative treatment for the in situ stabilization of polychlorinated biphenyls (PCB) in sediment under field conditions at Hunters Point Naval Shipyard, California. The treatment involves granular activated carbon (GAC) sorbent mixed with sediment to reduce contaminant bioavailability.

In Situ Bioremediation of Perchlorate in Vadose Zone Soil Using Gaseous Electron Donors (CU-0511)
Principal Investigator: Patrick Evans/Camp Dresser & McKee, Inc.
Perchlorate in vadose-zone soil can serve as an ongoing source of groundwater contamination. This project will demonstrate and validate Gaseous Electron Donor Injection Technology (GEDIT) as a cost-effective in situ bioremediation technology for treatment of perchlorate in vadose-zone soil as well as develop a guidance document for the use of this technology.

A Low-Cost, Passive Approach for Bacterial Growth and Distribution for Large-Scale Implementation of Bioaugmentation (CU-0513)
Principal Investigator: Joey Trotsky/Naval Facilities Engineering Service Center
Bioaugmentation has not been validated or optimized at full scale. In support of its optimal use across DoD, the objective of this project is to compare a low-cost passive approach for implementation of bioaugmentation to the more expensive recirculation approaches for full-scale application at a scale of hundreds of feet or more.

Demonstration and Certification of Amphibian Ecological Risk Assessment Protocol (CU-0514)
Principal Investigator: Amy Hawkins/Naval Facilities Engineering Service Center
The objective of this project is to demonstrate two innovative amphibian ecological risk assessment (ERA) protocols and seek American Society for Testing and Materials (ASTM) certification, leading to regulatory and end-user acceptance. This will allow DoD to make informed, cost-effective risk management and risk reduction decisions using relevant technologies at its installations.

Bioaugmentation for Groundwater Remediation (CU-0515)
Principal Investigator: Robert Steffan/Shaw Environmental and Infrastructure, Inc.
DoD owns several hundred chlorinated solvent-contaminated aquifers, and studies to date suggest that many of these sites may not have the dechlorinating microorganisms necessary to attenuate these plumes naturally. This project will generate the data necessary to produce a guidance document for selecting, costing, and applying anaerobic bioaugmentation for remediation of chlorinated solvent-contaminated aquifers.

Enhancing Natural Attenuation Through Bioaugmentation with Aerobic Bacteria That Degrade Cis-1,2-Dichloroethene (CU-0516)
Principal Investigator: David Major/GeoSyntec Consultants, Inc.
The objective of this project is to evaluate the effectiveness of JS666 as a bioaugmentation agent that enhances the natural attenuation of cis-1,2-dichloroethene in aerobic aquifers without further bioaugmentation or addition of nutrients. Bioaugmentation with JS666 could result in savings to DoD of $1.5 to $2.7 billion over pump-and-treat remedies.

The Effect of Soil Properties on Decreasing Toxic Metal Bioavailability: Field Scale Validation to Support Regulatory Acceptance (CU-0517)
Principal Investigator: Amy Hawkins/Naval Facilities Engineering Service Center
This project seeks to obtain regulatory acceptance of in vitro methods and the Soil BioAccessibility Tool for assessing toxic metal bioavailability in DoD soils. Results will provide site managers and risk assessors with tools to make better initial estimates of risk, prioritize sites for detailed investigation, and eliminate sites from further risk assessment.

Use of Nucleic Acid-Based Tools for Monitoring Biostimulation and Bioaugmentation (CU-0518)
Principal Investigator: Shirin Tolle/Naval Facilities Engineering Service Center
The objective of this project is to reduce DoD remediation costs at chlorinated solvent sites by applying a nucleic acid-based toolkit to support sites where monitored natural attenuation (MNA) is being evaluated, predict sites where biostimulation will be successful, and identify sites where bioaugmentation is required.

Field Demonstration/Validation of Electrolytic Barriers for Energetic Compounds at Pueblo Chemical Depot (CU-0519)
Principal Investigator: David Gilbert/Colorado State University
This project will demonstrate and validate the efficacy of an electrolytic reactive barrier (e-barrier) for treatment of RDX in groundwater at the Pueblo Chemical Depot, Colorado. Through a panel of closely spaced permeable electrodes intercepting a plume of contaminated groundwater, application of an electrical potential leads to sequential oxidation and reduction of contaminants to environmentally benign by-products.

COMPLIANCE

Biological Treatment of Solvent-Based Paint (CP-0520)
Principal Investigator: Tom Torres/Naval Facilities Engineering Service Center
The objective of this project is to demonstrate and validate the on-site biological treatment of expired shelf-life paint as an economically and technically practical solution to the problem of waste paint disposal. A full-scale biological treatment system will be assembled using commercially available components at Pearl Harbor, Hawaii.

Vapor Recovery by Electrothermal Swing Adsorption (CP-0521)
Principal Investigator: K. James Hay/U.S. Army Corps of Engineers, Engineer Research and Development Center, Construction Engineering Research Laboratory
DoD conducts numerous activities that generate volatile organic compounds (VOC), such as painting, paint stripping, and solvent cleaning. Efficient and practical vapor recovery technologies are needed to reduce air pollution and facilitate compliance. This project will demonstrate that the VaPRRS™ technology, a regenerative filter system, can be efficiently and economically operated to control VOCs from a dedicated waste stream.

Constructed Wetlands for the Remediation and Beneficial Reuse of Dredged Sediments (CP-0522)
Principal Investigator: Leslie Karr/Naval Facilities Engineering Service Center
Constructed wetlands are a proven technology used to treat a wide variety of contaminated wastewaters. The objective of this project is to demonstrate and validate the constructed wetland technology as an economically and technically practical solution for dredged sediment remediation and beneficial reuse at Pearl Harbor, Hawaii.

Demonstration of an Integrated Compliance Model for Predicting Copper Fate and Effects in DoD Harbors (CP-0523)
Principal Investigator: Bart Chadwick/SPAWAR Systems Center
The objective of this project is to demonstrate and validate an integrated harbor-scale fate and effects model for copper in DoD harbors. This model will account for the natural characteristics of the harbor, including transport, flushing, sediment exchange, and complexation to achieve more scientifically based, cost-effective compliance.

Pilot-Plant Evaluation of Integrated Iron-Fenton Process for Treatment of Pink Water (CP-0524)
Principal Investigator: Byung Kim/U.S. Army Corps of Engineers, Engineer Research and Development Center, Construction Engineering Research Laboratory
This project will conduct two pilot-plant studies to demonstrate the integrated iron Fenton process and zero-valent iron process for treatment of pink water and RDX in process water, respectively. As a result, the optimal design and operational conditions for long-term performance and reliability of the technology will be determined.

POLLUTION PREVENTION

Demonstration of NoFoam System Technology for Aircraft Hangar and Fuel Farm Fire Suppression Foam System (PP-0525)
Principal Investigator: Rance Kudo/Naval Facilities Engineering Service Center
Despite the effectiveness and widespread use of aqueous film forming foam for firefighting purposes, its waste poses an environmental concern. This project will demonstrate and validate the NoFoam System Technology for performance discharge checks on existing DoD aircraft hangar and fuel farm fire suppression foam systems.

Robotic Laser Coating Removal System (RLCRS) (PP-0526)
Principal Investigator: Randel Bowman/Tinker Air Force Base
This project will demonstrate and validate a Robotic Laser Coating Removal System (RLCRS) as an alternative technology to the current chemical and mechanical methods that are used to remove coatings from large off-equipment aircraft components. The ultimate goal is to design a system of commercial off-the-shelf (COTS) components that can be easily integrated onto different robotic platforms, allowing individual depots to adapt the technology to meet their specific needs.

Validation of Novel Electroactive Polymers as Environmentally Compliant Coatings for Replacement of Hexavalent Chromium Pretreatments (PP-0527)
Principal Investigator: Peter Zarras/Naval Air Systems Command
The objective of this project is to demonstrate an effective, environmentally benign, repairable coating system using electroactive polymers as a replacement for chromated conversion coatings. Issues of application, removal, corrosion performance, repairability, and compatibility with substrate materials and primers will be addressed.

Demonstration/Validation of Zero VOC, Coal Tar Free Splash Zone Coating (PP-0528)
Principal Investigator: David Gaughen/Naval Facilities Engineering Service Center
The "Splash Zone" is defined as the area between the years' lowest tidal mark and up to 10 feet above the years' highest tidal mark, whereby corrosion rates have been documented to exceed 30 mils per year on unprotected steel. This project will demonstrate and validate innovative, low-VOC, coal tar-free, splash zone coatings that protect the surfaces of steel waterfront structures against corrosion.

Joint Army/Navy Program for Environmentally Acceptable Propellant Charges for Medium Caliber Guns (PP-0529)
Principal Investigator: Thelma Manning/U.S. Army Armament Research, Development and Engineering Center
The objective of this project is to demonstrate and validate new energetic thermoplastic elastomer (ETPE)-based propellants and green legacy propellants to replace medium caliber propellants containing environmentally objectionable plasticizers, stabilizers, and oxidizers.

UNEXPLODED ORDNANCE (UXO)

Demonstration and Validation of Advanced Digital Geophysics for Sensing UXO (UX-0501)
Principal Investigator: Larry Carin/Signal Innovations Group
In this project, state-of-the-art digital geophysics will be used to demonstrate and evaluate algorithms that adaptively delineate regions that are clean of UXO. For regions that are not clean, digital geophysics classification and detection algorithms will demonstrate and evaluate detection of UXO without requiring excavation of all items.

Target Picking Methods for Magnetic Data (UX-0502)
Principal Investigator: Dean Keiswetter/AETC Incorporated
Because of large numbers of possible targets identified in geophysical surveys of UXO sites, efficient and reliable machine-aided target pickers should be used to identify targets for subsequent characterization. The objective of this project is to identify target-picking routines that require minimal user input, are tolerant of difficult geology and overlapping anomalies, and can be tailored to different detection level requirements.

An Advanced ESTCP PELAN System for Surface and Sub-Surface UXO Discrimination (UX-0503)
Principal Investigator: Jeffrey Rajhel/SAIC
Range clearing operations benefit by distinguishing explosive-filled UXO from those that are inert. This project will test and implement practical detection algorithms that complement the advanced features of the advanced Pulsed ELemental Analysis with Neutrons (PELAN) system for quickly and reliably identifying UXO filler.

Practical Discrimination Strategies for Application to Live Sites (UX-0504)
Principal Investigator: Stephen Billings/Sky Research, Inc.
Statistical and rule-based classification techniques for UXO discrimination, when calibrated with good training data, have been shown at numerous test sites to be effective. However, guidelines and standard operating procedures for their application to live sites have yet to be established. This project aims to develop all the necessary software and protocols and test them at the Former Lowry Bombing and Gunnery Range, Colorado.

Performance Baselining of Geophysical Sensors: Detection Limits, Repeatability and Inter-Instrument Comparisons (UX-0506)
Principal Investigator: Ryan North/U.S. Army Corps of Engineers, Engineer Research and Development Center
Production ground surveys for UXO detection and discrimination typically use electromagnetic induction (EMI) and total field magnetometry (TFM) technologies. This project will characterize the repeatability of EMI and TFM detection systems, ensuring that critical UXO technology performance parameters such as detection capability and discrimination are quantified through standardized test methodologies and procedures.

Demonstration and Validation of Target Size Modeling Methods (UX-0507)
Principal Investigator: Michelle Crull/U.S. Army Corps of Engineers, Engineering and Support Center-Huntsville
The objective of this project is to develop and demonstrate a robust, flexible model for predicting the sizes and shapes of detectable fragmentation distributions that result from targets used for various indirect fire weapon systems. The resulting user-friendly model will allow a project team to determine search patterns and calculate appropriate transect spacing for indirect fire weapon systems.

Quantification of Noise Sources in EMI Surveys (UX-0508)
Principal Investigator: Herb Nelson/Naval Research Laboratory
This project will perform a series of demonstrations in which researchers will isolate, to the extent possible, and measure quantitatively the individual components of the noise budget for an EMI survey. A guidance document will suggest calibration procedures and operating parameters that can be performed on site to optimize analysis and classification algorithms that reduce the number of false alarms.

SERDP Awards FY 2005 Resear

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

CLEANUP

Fate of Plant Tissue Associated RDX in Surface Soil (CU-1412)
Principal Investigator: Charles Reynolds/U.S. Army Corps of Engineers, Engineer Research and Development Center, Construction Engineering Research Laboratory
Low-order and incomplete detonation has resulted in the surface distribution of RDX that is both heterogeneous and widely dispersed on training ranges. The objective of this project is to improve the understanding of RDX transformation in plant tissues and the subsequent cycling of tissue-associated RDX and RDX daughter products among soil mineral and humic fractions following plant senescence.

Development of Toxicity Benchmarks and Bioaccumulation Data for N-based Organic Explosives for Terrestrial Plants and Soil Invertebrates (CU-1416)
Principal Investigator: Geoffrey Sunahara/Biotechnology Research Institute, National Research Council of Canada
This project will develop toxicological data for energetic materials (EM) of interest for selected ecologically relevant soil invertebrate and terrestrial plant species. The toxicity benchmark values will be used for derivation of draft ecological soils screening levels. Bioaccumulation data will contribute to risk assessments of food chain transfer.

Oxygenase-Catalyzed Biodegradation of Emerging Water Contaminants: 1,4-Dioxane and N-Nitrosodimethylamine (CU-1417)
Principal Investigator: Lisa Alvarez-Cohen/University of California-Berkeley
1,4-dioxane and N-Nitrosodimethylamine (NDMA) are probable human carcinogens and confirmed animal carcinogens. Neither is significantly attenuated in the environment by volatilization or sorption processes. The objectives of this project are to (1) develop a mechanistic understanding of the enzymes, pathways, and kinetics of biodegradation of these emerging contaminants by bacteria expressing oxygenase enzymes and (2) evaluate the effects of relevant contaminant mixtures on their degradation rates.

Lanthanide-Containing Cyclophanes for the Detection of Explosives and Propellants (CU-1418)
Principal Investigator: Nicholas Prokopuk/Naval Air Warfare Center Weapons Division
Chemical sensors based on molecular recognition events promise detection with high selectivity and sensitivity. This project will demonstrate a fieldable, screening-level chemical assay for perchlorate ions and nitroaromatic explosives. The optical response of lanthanide-modified cyclophanes will transduce analyte presence into a readable output.

Investigation of Chemical Reactivity, Mass Recovery and Biological Activity During Thermal Treatment of DNAPL Source Zones (CU-1419)
Principal Investigator: Kurt Pennell/Georgia Institute of Technology
The objective of this project is to investigate fundamental physical, chemical, and biological processes governing thermal remediation of dense non-aqueous phase liquid (DNAPL) source zones. Despite the success of several thermal technologies in pilot and full-scale applications, only limited data are available regarding the phase distribution, chemical reactivity, and microbial reductive dechlorination activity at elevated temperatures and following thermal treatment in subsurface environments.

Development of Toxicity Data for Munition Compounds to Support Toxicity Reference Value Derivations for Wildlife (CU-1420)
Principal Investigator: Mark Johnson/U.S. Army Center for Health Promotion & Preventive Medicine
This project will define acute, subacute, and subchronic effects of exposure to munition compounds in representative wildlife species. Particular emphasis will be given to sublethal endpoints and targets of toxicity. Biomarkers of effect also will be investigated.

Abiotic and Biotic Mechanisms Controlling In Situ Remediation of NDMA (CU-1421)
Principal Investigator: James McKinley/Pacific Northwest National Laboratory
Initial studies have shown that NDMA can be degraded below the drinking water action level by the reduction of sediment with dithionate. This project will investigate abiotic and coupled abiotic/biotic processes that lead to NDMA degradation in chemically reduced natural sediment and in hydrogen abiotically produced by ferrous minerals, as well as the potential for microbial metabolism to facilitate direct degradation and indirect degradation by production of hydrogen.

Biodegradation of 1,4-Dioxane (CU-1422)
Principal Investigator: Robert Steffan/Shaw Environmental & Infrastructure, Inc.
The objectives of this project include: (1) evaluate biodegradation of 1,4-dioxane in environmental samples under different redox and chemical/physical conditions and treatment regimes; (2) identify and isolate new 1,4-dioxane degrading microbes from environmental microcosms; (3) identify the products of 1,4-dioxane biodegradation by studying degradation pathways in pure bacterial cultures; and (4) confirm that the same biodegradation pathways occur in active environmental samples.

Large-Scale Physical Models of Thermal Remediation of DNAPL Source Zones in Aquifers (CU-1423)
Principal Investigator: Ralph Baker/TerraTherm, Inc.
In situ thermal remediation technologies are receiving increased attention for remediation of DNAPL source zones in soil and groundwater. This project will determine the relative significance of the various contaminant removal mechanisms below the water table; assess the percentage of source removal and accompanying changes in water saturation at various treatment temperatures/durations; and evaluate the potential for mobilization outside the target treatment zone during heating.

Bioremediation Approaches for Treating Low Concentrations of N-Nitrosodimethylamine in Groundwater (CU-1456)
Principal Investigator: Paul Hatzinger/Shaw Environmental & Infrastructure, Inc.
The objective of this project is to develop viable in situ and ex situ bioremediation strategies for treating groundwater contaminated with low concentrations of NDMA. Specific strains of propane- and toluene-oxidizing bacteria capable of degrading NDMA will be investigated as a potentially cost-effective treatment solution at DoD sites.

Prospects for Remediation of 1,2,3-Trichloropropane by Natural and Engineered Abiotic Degradation Reactions (CU-1457)
Principal Investigator: Paul Tratnyek/Oregon Health & Science University
This project will determine the rates and products for all likely pathways of abiotic degradation of 1,2,3-Trichloropropane (TCP). Data then will be used to assess under what conditions these reactions might be useful for remediation of contaminated groundwater, including natural attenuation rates and design/scaling calculations.

In Situ Thermal Remediation of DNAPL Source Zones (CU-1458)
Principal Investigator: Richard Johnson/Oregon Health & Science University
Electrical resistance heating (ERH) has significant potential for effective remediation of DNAPL source zones. This project will use well-controlled very large-scale experimental aquifers, coupled with numerical modeling, to improve understanding of the processes that lead to successful source zone remediation with ERH and to translate the results of those experiments into practical in situ thermal remediation guidelines.

COMPLIANCE

Impulse Noise Bearing and Amplitude Measurement and Analysis System (BAMAS) (CP-1427)
Principal Investigator: Bruce Abraham/Applied Physical Sciences Corporation
By necessity, military training exercises produce high-magnitude, short duration noise events that can cause concern in nearby residential or environmentally sensitive areas. This project will develop an improved system for the measurement and analysis of impulsive acoustic noise that exclusively detects offending noise sources and rejects false positive detections from wind gusts and other off-base events.

Modified Activated Carbon Perchlorate Sorbents (CP-1428)
Principal Investigator: Wayne Lukens/Lawrence Berkeley National Laboratory
This SEED project will develop granular modified activated carbon anion exchange materials that have a high selectivity for perchlorate when treating drinking water in a single-use system without regeneration. These materials also could be used as an attachment surface for perchlorate-reducing bacteria in support of bioremediation.

Evaluation of Alternative Causes of Wide-Spread, Low Concentration Perchlorate Impacts to Groundwater (CP-1429)
Principal Investigator: Evan Cox/GeoSyntec Consultants
The objective of this project is to identify and ultimately quantify, to the extent possible, the potential impacts of wide-ranging, non-military perchlorate inputs to the environment, such as fertilizers, road flares, and fireworks or other pyrotechnics. Further, the project will expand on previous research to understand and quantify the potential impact of sulfonates on the reliability of perchlorate detections in groundwater.

Removal of Perchlorate from Water and Wastewater by Catalytic Hydrogen Gas Membrane Systems (CP-1430)
Principal Investigator: Chin-Pao Huang/University of Delaware
This project will develop catalytic gas membrane systems for the removal of perchlorate from waters using hydrogen as the reducing agent. As a powerful chemical reduction process, the technology can be applied to many other water contaminants, including nitrate, iodate, bromate, and toxic organic chemicals such as halogenated hydrocarbons.

Biotic and Abiotic Attenuation of Nitrogenous Energetic Compounds in Coastal Waters and Sediments (CP-1431)
Principal Investigator: Michael Montgomery/Naval Research Laboratory
This project will determine and predict the fate of nitrogenous energetic compounds (NEC) released from munitions in coastal waters and submerged sediments. Researchers will assess the potential for underwater degradation and transport of such compounds in fresh, brackish, and saltwater environments representative of DoD aquatic ranges.

Novel Electrochemical Process for Treatment of Perchlorate in Waste Water (CP-1433)
Principal Investigator: Jagan Bontha/Pacific Northwest National Laboratory
The objective of this **SE**RDP **E**xploratory **D**evelopment (SEED) project is to develop an innovative and cost-effective technology for the treatment of perchlorate from wastewaters generated by treatment processes. The technology is based on an electroactive ion exchange technique combined with nanostructured electroactive ion exchange materials. The technology will be sufficiently safe as to be easily extended for the treatment of drinking water.

Identification and Characterization of Natural Sources of Perchlorate (CP-1435)
Principal Investigator: Gregory Harvey/U.S. Air Force, Wright-Patterson AFB
Perchlorate is more widespread in the environment than initially anticipated, albeit at relatively low concentrations with sources that are not linked to known anthropogenic sources. This project seeks to describe and confirm natural mechanisms of perchlorate production; hydrologic and geochemical processes for its selective geographic concentration; and atmospheric and geochemical processes involved in the formation of natural perchlorate in near-surface, geologically young environments.

Development of Metrics for Identifying Military Impulse Noise Sources (CP-1436)
Principal Investigator: Jeffrey Vipperman/University of Pittsburgh
This SEED project will develop the software algorithms that comprise an automated noise classification system. Novel noise classifying features will be implemented, based on metrics that are commonly used to characterize impulse and impact noise. The software developed will form the basis of a real-time noise classification system that can autonomously discern between wind and military impulse noise.

Defining Munitions Constituent Source Terms in Aquatic Environments on DoD Ranges (CP-1453)
Principal Investigator: Bill Wild/Space and Naval Warfare Systems Center
To make informed decisions relating to active range compliance issues and the Munitions Response Program, DoD must understand the environmental effects of underwater munitions constituents (MC). This project will develop a predictive modeling capability of MC fate and transport associated with an unexploded breached projectile.

Metal Ion Sensor with Catalytic DNA in a Nanofluidic Intelligent Processor (CP-1459)
Principal Investigator: Donald Cropek/U.S. Army Corps of Engineers, Engineer Research and Development Center, Construction Engineering Research Laboratory
Building on the successes of SERDP SEED project CS-1265, this project will develop a highly selective and sensitive miniaturized sensor for lead. The sensor will combine catalytic DNA that is reactive only to lead and can be tagged to produce fluorescence only in the presence of the metal and nanoscale fluidic molecular gates that can manipulate fluid flows and perform molecular separations on tiny volumes of material.

◆ ◆ ◆ CONSERVATION ◆ ◆ ◆

Advanced Monitoring of Migratory Birds on Military Lands (CS-1438)
Principal Investigator: Anna Pidgeon/University of Wisconsin-Madison
Accurate forecasts and visual indicators represent important components of migratory bird monitoring for the military, as they aid in planning training exercises, conserving threatened and endangered species and habitats, and reducing bird aircraft strike hazard levels. This project will identify the fundamental relationships between elements that define migratory bird habitat and develop texture-based image processing methods for high-resolution satellite data to forecast migratory bird distribution and abundance.

The Identification of Military Installations as Important Migratory Bird Stopover Sites and the Development of Bird Migration Forecast Models: A Radar Ornithology Approach (CS-1439)
Principal Investigator: Richard Fischer/U.S. Army Corps of Engineers, Engineer Research and Development Center
The conservation of migratory birds on military installations is a growing issue, as populations of many species are in decline and fragmentation continues to threaten high-quality habitats. This project will (1) identify installations that have important migratory bird stopover sites (i.e., hot spots); (2) document patterns of bird migration; (3) verify those sites identified using radar technology as migratory bird stopover hot spots; and (4) develop forecast models of bird migration for installations and surrounding areas.

◆ ◆ ◆ POLLUTION PREVENTION ◆ ◆ ◆

Development of Chrome-Free Welding Consumables for Stainless Steels (PP-1415)
Principal Investigator: Gerald Frankel/Ohio State University
Fabrication of stainless steels by arc welding results in the generation of welding fume containing hexavalent chromium. This project will develop a chrome-free welding consumable for 300-series stainless steels that significantly reduces hexavalent chromium in the welding fume while maintaining corrosion and mechanical properties of the weld.

Alternative for Perchlorates in Incendiary Mix and Pyrotechnic Formulations for Projectiles (PP-1424)
Principal Investigator: Trevor Griffiths/QinetiQ
This project aims to prepare and assess environmentally benign perchlorate-free pyrotechnic formulations based on novel oxidizers and fuels. The ultimate goal is to eliminate future contamination of soil, surface water, and groundwater with perchlorate from the training, testing, production, and disposal of incendiary munitions.

Investigation of Chemically Vapor Deposited Tantatlum for Medium Caliber Gun Barrel Protection (PP-1425)
Principal Investigator: Roland Levy/New Jersey Institute of Technology
Chromium is widely used as a protective coating on the interior bore surfaces of medium caliber gun barrels. As an environmentally benign alternative to chromium plating, this project will investigate the use of atmospheric pressure chemical vapor deposition (APCVD) to produce high-quality tantalum coatings for wear and erosion protection.

Chromium Elimination in Medium Caliber Gun Barrels (PP-1426)
Principal Investigator: Michael Audino/U.S. Army Benet Laboratories
The objective of this project is to develop an environmentally benign (i.e., hexavalent chromium-free, low volatile organic compound, low hazardous air pollutant) coating deposition process to replace the current electrodeposition process without compromise to wear life or performance of medium caliber guns (20 to 40 millimeter).

Non-Leaching, Benign Antifouling Multilayer Polymer Coatings for Marine Applications (PP-1454)
Principal Investigator: Christopher Ober/Cornell University
This project will develop environmentally friendly, copper-free fouling release coatings based on preliminary studies that were conducted under SERDP SEED project PP-1274. In cooperation with KRATON Polymers, researchers will select the optimal surface-active block polymer and establish commercially viable approaches to synthesize and fabricate anti-fouling coatings in large quantity and screen processes for coating ships.

See SERDP AWARDS, page 8

SERDP Awards FY 2005 Research and Development Initiatives

(Information on these newly funded efforts can be found on the SERDP web site at www.serdp.org under the *Research Projects* link.)

Clean Electrochemical Synthesis of Alkylnitro Compounds (PP-1460)
Principal Investigator: Kirstin Warner/ATK Thiokol
Building on the recently completed SERDP SEED project PP-1345 that investigated electrochemical oxidation processes for synthesis of energetic materials with DoD, this project will pursue and optimize a clean, electrochemical synthesis route for production of 2,2-dinitro-1-propanol (DNPOH) from 2-nitropropanol or preferably from nitroethane and formaldehyde. DNPOH is the starting material for the energetic plasticizer employed in the new Insensitive Munitions (IM) explosives.

◆ ◆ ◆ UNEXPLODED ORDNANCE (UXO) ◆ ◆ ◆

Characterization of Freshwater EM Subbottom Sediment Properties and Target Responses for Detection of UXO with Ground-Penetrating Radar (UX-1440)
Principal Investigator: Steven Arcone/U.S. Army Corps of Engineers, Engineer Research and Development Center, Cold Regions Research and Engineering Laboratory
A system is needed to detect and characterize UXO existing within freshwater river bottom or lake bottom sediments. The objectives of this project are to prove and quantify the penetration of 200-800 megahertz (MHz) Ground-Penetrating Radar (GPR) signals within freshwater subbottom sedimentation and to define the electromagnetic (EM) and geologic matrix profile characteristics of buried, single, typical targets.

UXO Navigation Technology (UX-1441)
Principal Investigator: Jack Foley/Sky Research Inc.
Reliable and precise navigation technology is essential for the robust detection and discrimination of UXO in a wide range of field conditions. This project will (1) identify and quantify performance specifications and system operating requirements for navigation technologies based on geophysical data requirements and (2) modify existing laser-based technologies and integrate them with industry standard sensors.

Statistical and Adaptive Signal Processing for UXO Discrimination for Next-Generation Sensor Data (UX-1442)
Principal Investigator: Leslie Collins/Duke University
To address the limitations associated with current UXO sensors, SERDP and ESTCP have supported the development of a new generation of sensors that produce multi-axis vector or gradiometer measurements, for which optimal processing has not yet been carefully considered or developed. This project will address the processing gap for multi-axis vector and gradiometer measurements, employing a synergistic use of advanced phenomenological modeling and signal-processing algorithms.

New Man-Portable Vector Time Domain Electromagnetic Induction Sensor and Physically Complete Processing Approaches for UXO Discrimination Under Realistic Field Conditions (UX-1443)
Principal Investigator: Kevin O'Neill/U.S. Army Corps of Engineers, Engineer Research and Development Center
This project will develop further a new generation of electromagnetic induction (EMI) forward modeling, apply it in discrimination processing, and develop instrumentation that will provide the data needed to support this new processing. Realistic field conditions at UXO sites, including rugged terrain and possibly sparse vegetation, will be addressed.

Compact, Low-Noise Magnetic Sensor with Fluxgate (DC) and Induction (AC) Modes of Operation (UX-1444)
Principal Investigator: Yongming Zhang/QUASAR, Inc.
Future advanced UXO detection systems will require a combination of alternating current (AC) and direct current (DC) magnetic measurements and 3-axis vector sensors to provide characterization of the target shape and reduce false alarm rates. The goal of this **SE**RDP **E**xploratory **D**evelopment (SEED) project is to develop a compact sensor that operates both as a fluxgate to sense the DC B-field and as a magnetic induction sensor to sense the AC B-field.

Electromagnetic 3-Component Array Sensors for UXO Discrimination (UX-1445)
Principal Investigator: Michael Asten/Flagstaff GeoConsultants Pty Ltd.
This project will investigate noise levels and sensitivities of fluxgate and Superconducting Quantum Interference Device (SQUID) EM sensors to provide a firm recommendation on which sensor can be optimized for use in a future project to develop a new discrimination algorithm. The new vector EM sensors are expected to provide significantly improved decay-rate definition of UXO target responses, providing a future method capable of significantly enhanced discrimination between metal fragments and intact munitions.

A Unified Approach to UXO Discrimination Using the Method of Auxiliary Sources (UX-1446)
Principal Investigator: Leonard Pasion/Sky Research Inc.
This SEED project seeks to develop iMAS, a general inversion methodology based on the Method of Auxiliary Sources that can be used to invert any combination and configuration of magnetic, time-domain electromagnetic (TEM) and frequency-domain electromagnetic (FEM) induction data. The MAS forward model represents an increased level of sophistication relative to the dipole models used in current inversion algorithms.

A New Sensor Based Upon a Rotating-Coil Electromagnetic Induction Concept (UX-1447)
Principal Investigator: Jim McDonald/AETC Incorporated
The objective of this SEED project is to design a frequency-domain EMI UXO sensor using a DC-driven transmitter coil. The benefit of this approach is predicated on the importance of new information to be acquired in the extremely low frequency (ELF) region pertaining to a metallic object's shape, composition, and wall thickness, which may be critical in UXO discrimination.

Moving Belt Metal Detector (UX-1448)
Principal Investigator: Deborah Mendat/Johns Hopkins University
This SEED project addresses the need for improved surveys of UXO-contaminated sites via the development of an advanced, robust moving belt metal detector (MBMD) that increases the sensor dwell time and reduces motion-induced sensor noise.

Monte Carlo Engine for Electromagnetic Induction Analysis (UX-1449)
Principal Investigator: Jonathan Miller/AETC Incorporated
Successful detection and classification of buried targets depends on the quality of data available from geophysical surveys. This SEED project will apply the advantages of Monte Carlo simulation to allow precise investigation of the relationships between factors governing data quality without loss of flexibility in defining the behavior of each system component.

Frequency Domain Electromagnetic Sensor Array Development (UX-1450)
Principal Investigator: David Wright/AETC Incorporated
As compared to separately deployed electromagnetic induction sensor and magnetometer arrays, a combined array has the advantage of increased UXO detection efficiency. The objective of this SEED project is to develop at the proof-of-principle level a multifrequency, continuous-wave frequency-domain electromagnetic (CWFDEM) induction sensor array suitable for simultaneous operation with an array of magnetometers.

Empirical Corrections to Dipole Model (UX-1451)
Principal Investigator: Jonathan Miller/AETC Incorporated
This SEED project will develop an empirical method for removing errors in the standard Dipole Model when it is used to approximate the response of real UXO. The model initially will be demonstrated for the 81-millimeter mortar. Improvements will facilitate successful deployment of discrimination schemes based on EMI technology.

Intra-Inversion Filtering for Use of Magnetic Fields to Locate and Characterize Magnetic Dipoles for UXO Cleanup (UX-1452)
Principal Investigator: Raymond Rene/Rene Geophysics
This SEED project seeks to improve magnetic field inversion in the presence of common noise sources (clutter, magnetic soils, and rocks), overlapping fields of multiple targets, finite extent of the survey area, and data gaps related to terrain and vegetation by developing and proving concepts of intra-inversion filtering and background estimation using a variety of filters, including those that greatly distort the dipole signals.

Use of Target Shape and Size in Classification of UXO in Survey Data (UX-1455)
Principal Investigator: Jim McDonald/AETC Incorporated
Clearing UXO ranges invariably requires digging 5-100 items for every recovered intact ordnance item. The objective of this project is to develop a more sophisticated automated screening approach (i.e., target picker) that improves the ability to reject clutter targets in UXO cleanup while retaining the ability to capture intact ordnance.

Management Structure Changes for SERDP and ESTCP Under Way

SERDP and ESTCP are revamping the programs' management structure to better reflect DoD's current environmental focus areas.

When SERDP was created in 1990, it followed the four pillars established by the Department of Defense to address environmental issues—Cleanup, Compliance, Conservation, and Pollution Prevention—and later instituted Unexploded Ordnance (UXO) as a separate area. ESTCP, established in 1995, was organized similarly, but without a separate Conservation area.

As DoD's environmental requirements have evolved in recent years, the original pillar structure for the two programs has become limiting because the categories no longer adequately address DoD's mission areas. "Although the pillar approach served both programs well for many years, it has become less effective as a management structure in the last few years as DoD's environmental issues spanned multiple pillars," said Dr. Jeffrey Marqusee, director of ESTCP.

Environmental issues affect the military in two major ways, explained Mr. Bradley Smith, executive director of SERDP. "The first is the sustainability of realistic military training and testing ranges. The second is the costs associated with both current and future environmental liabilities," said Mr. Smith.

"Both of these broad issues have significant impacts on the ability of the Department to fulfill its mission," he said. "As such, they form the basis for the overarching investment strategy for SERDP and ESTCP."

The new management structure for both programs consists of four thrust areas to address these goals: Sustainable Infrastructure, Weapons Systems and Platforms, Environmental Restoration, and Munitions Management.

Sustainable Infrastructure (SI) encompasses the technologies required to sustain training and testing ranges, as well as the installation infrastructure that supports those ranges and the deployed forces. SI is subdivided into natural resources, facilities, and cultural resources.

Weapons Systems and Platforms (WP) focuses on reducing the current and future environmental liabilities associated with DoD weapons and platforms. WP addresses issues associated with the design, manufacture, and maintenance of weapons systems and platforms built by original equipment manufacturers, as well as the manufacturing, maintenance, and repair processes at DoD facilities such as depots, shipyards, and ammunition plants. This area also includes green energetics and emissions from the platforms, weapons, and industrial processes.

Environmental Restoration (ER) addresses the reduction of the Department's liabilities by developing and demonstrating technologies for the cost-effective detection, characterization, containment, and remediation of contamination in soil, sediments, and water. This area includes understanding the fate, transport, and effects of contaminants in the environment.

Munitions Management (MM) focuses on the environmentally responsible management of military munitions. It has two main aspects. The first is the detection, discrimination, and remediation of UXO from closed, transferred, and transferring ranges to reduce the current liabilities associated with these ranges. The second aspect focuses on active range clearance and reduced generation of UXO during live fire operations.

SERDP and ESTCP Principal Investigators have been notified about the areas in which their projects will be managed under the new structure. ◆

PERCHLORATE ALTERNATIVES, from page 2

effort, investigators selected one primary and two secondary scale-up candidate compositions. In performance tests, the three candidates exceeded the radiant intensity in the longer wavelength infrared band, as compared to the in-service perchlorate formulation. However, they did not achieve a spectral ratio long band/short band that was as high as that found in the control. Of the three candidates, the selected scale-up candidate most closely approached the spectral ratio of the in-service perchlorate composition. Thermal and ignition sensitivity measurements also were performed on the spectrally balanced scale-up composition, as well as the high-energy fuel ingredients of the composition. Overall, the testing indicated that the scaled-up composition shows promise as a replacement for in-service flares; however, the spectral ratio must be improved before the perchlorate-free device can enter service.

The use of alternative pyrotechnic formulations has the advantage of providing signal and decoy flares that are free of harmful perchlorate without sacrificing performance. The success of this project is an important step forward in the effort to remove perchlorate from energetic formulations, ultimately reducing future liabilities for DoD.

For further information, please contact Dr. Robert Shortridge, U.S. Navy, Naval Surface Warfare Center-Crane Division, at (812) 854-2816 or via e-mail at robert.shortridge@navy.mil. ◆

Program Development Update

SERDP

Following the independent peer review evaluation of the 191 full proposals received in response to the FY 2006 SERDP Core Solicitation in April, 97 Core proposals were forwarded for review to the Technology Thrust Area Working Groups (TTAWG). The TTAWGs reviewed these Core proposals in May and June, along with 19 of the 60 proposals received in response to the FY 2006 **S**ERDP **E**xploratory **D**evelopment (SEED) Call for Proposals. The TTAWG downselect meetings were held in June and July, and recommendations were made to the SERDP Executive Director for the FY 2006 CORE and SEED efforts.

Twenty-three proposals were received on April 28, 2005, in response to the FY 2005 **Defense Coastal/ Estuarine Research Program (DCERP)** special SERDP solicitation. This solicitation was for proposals that defined the process/approach by which to develop the design of an ecosystem monitoring system for the coastal area and dunes, coastal waters of Onslow Bight (to a depth of 10 meters), the estuarine waters of the New River and the lands incorporated within Marine Corp Base Camp Lejeune, as well as the land within the watershed of the New River.

Following the external peer review in May and June, three top-ranked proposals were reviewed internally by the TTAWG, and recommendations were made to the SERDP Executive Director.

ESTCP

Of the 157 pre-proposals received in response to the ESTCP FY 2006 Call for Proposals and Broad Agency Announcement, the ESTCP Review Committees were requested to review 98 relevant pre-proposals during April and May. Their recommendations on those that merited further development by submitting a full proposal were made at the end of May. In mid-June, 44 proposers were requested to submit full proposals which are due August 11, 2005. In September selected proposers will be asked to present their proposals to the ESTCP Review Committees, following which selection recommendations will be made to the Director.

Two FY 2005 ESTCP special solicitations also were released last fall. Following is an update on each.

Perchlorate Treatment Demonstration Project. The Department of Defense, through ESTCP, will be funding demonstration projects for the wellhead treatment of perchlorate in drinking water. The objective of this effort is to evaluate alternative technologies that can significantly reduce the costs of removing perchlorate for large-scale drinking water treatment. The demonstrations will be conducted at selected public water supply utilities in southern California that have been impacted by perchlorate. Forty-one pre-proposals were received in response to the Perchlorate solicitation, and 13 proposers were asked to submit full proposals by April 20.

Technologies for Wide Area Assessment of UXO-Contaminated Sites. ESTCP will be funding projects to conduct demonstrations of wide area assessment technologies at UXO-contaminated sites. Proposals were requested to demonstrate and validate 1) data collection assets and methodologies and/or 2) analysis and decision support tools that can significantly reduce the total cost of remediation of large sites partially contaminated with UXO and provide the basis for more sound and defensible risk projections for planning remediation activities. Of the 23 relevant pre-proposals received, 10 were requested to submit a full proposal. Through this competitive selection process, five proposals were selected for funding. The demonstrations will be conducted at multiple sites representing a range of ordnance and site conditions. ◆

Congratulations to . . .

SERDP Principal Investigator **Dr. Tissa H. Illangasekare,** AMAX distinguished Professor of Environmental Science and Engineering and Professor of Civil Engineering at the Colorado School of Mines, whose eminence in the geophysical sciences was recently recognized through his election as a Fellow of the American Geophysical Union (AGU). In any given year, this honor is bestowed on only 0.1% of the AGU membership, which in 2005 was approximately 42,000. Five Fellows, including Dr. Illangasekare, were selected from the Hydrology section of AGU. Dr. Illangasekare was honored for his sustained superior research in subsurface environmental processes and remediation techniques, specifically the fate and transport of chemicals through porous and fractured media.

Under SERDP funding, he is developing characterization methods and predictive tools for mass transfer from dense non-aqueous phase liquid (DNAPL) sources undergoing remediation. His experimental, field, and numerical modeling investigations related to this and other research will lead to improved and cost-effective cleanup methodologies and decision-making processes for persistent contaminants, such as DNAPL, in the environment.

Dr. Illangasekare was recognized at an Honors Ceremony held May 25 in New Orleans, Louisiana, in conjunction with the 2005 Joint Assembly. ◆

PROGRAM NOTES

- **MARK YOUR CALENDAR FOR SERDP AND ESTCP'S ANNUAL PARTNERS IN ENVIRONMENTAL TECHNOLOGY TECHNICAL SYMPOSIUM & WORKSHOP SCHEDULED TO BE HELD NOVEMBER 29-DECEMBER 1, 2005,** at the Marriott Wardman Park Hotel, Washington, D.C. For information on registering for the Symposium, visit www.serdp.org or www.estcp.org, send an e-mail to partners@hgl.com, or call the contact line at (703) 736-4548.
- **THE COMBINED SERDP AND ESTCP IN-PROGRESS REVIEWS (IPR) FOR THE FALL SEASON** will be held in Arlington, Virginia, during October.

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- **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 2005 were due July 15, and data for the fourth quarter of government FY 2005 are due October 15. For assistance, SERDP PIs should contact their Program Manager Assistant.
- **THE SERDP SCIENTIFIC ADVISORY BOARD (SAB)** is scheduled to meet twice September 13-15 and October 18-20 in Arlington, Virginia, to review primarily New Start projects. Contact Misa Jensen at (703) 696-2126 or via e-mail at misa.jensen.ctr@osd.mil for additional information.
- **THE FY 2004 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 2004, new initiatives to be undertaken during FY 2005, and plans for FY 2006. The Annual Report is available on the SERDP web site www.serdp.org by selecting Publications & Products under the *General Information* link.

E◆S◆T◆C◆P

- **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 2005 were due July 15, and data for the fourth quarter of government FY 2005 are due October 15. For assistance, ESTCP PIs should contact their Program Manager Assistant.

S◆E◆R◆D◆P and E◆S◆T◆C◆P Online Library

- **NEW PUBLICATIONS ARE NOW AVAILABLE AT THE SERDP & ESTCP ONLINE LIBRARY** (http://docs.serdp-estcp.org). Conduct search by entering project number (e.g., 9921) under Search Phrase.

Cleanup

- *Final Report: Push-Pull Tests for Evaluating the Aerobic Cometabolism of Chlorinated Aliphatic Hydrocarbons (ESTCP CU-9921)*
- *Protocol: Field Push-Pull Test Protocol for Aerobic Cometabolism of Chlorinated Aliphatic Hydrocarbons (ESTCP CU-9921)*
- *Final Report: Electrically Induced Redox Barriers for Treatment of Groundwater (ESTCP CU-0112)*

UXO

- *Cost and Performance Report: Airborne UXO Surveys Using the Multi-Sensor Towed Array Detection System (MTADS) (ESTCP UX-0031)*
- *Final Report: Airborne UXO Surveys Using the MTADS (ESTCP UX-0031)*
- *Final Report: High Resolution Inductive Sensor Arrays for UXO Detection, Identification and Clutter Suppression (SERDP UX-1326)*

PARTNERS IN ENVIRONMENTAL TECHNOLOGY

STRATEGIC ENVIRONMENTAL RESEARCH AND DEVELOPMENT PROGRAM (SERDP)

&

ENVIRONMENTAL SECURITY TECHNOLOGY CERTIFICATION PROGRAM (ESTCP)

INFORMATION BULLETIN

SUMMER 2005 NUMBER 24

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FOR SERDP AND ESTCP

SEPTEMBER 2005

September 7-8
ESTCP Munitions Management (MM) Review Committee Proposal Downselect Meeting

September 13-15
SERDP Scientific Advisory Board (SAB) Meeting

September 16
SERDP Executive Working Group Meeting

September 20-21
ESTCP Weapons Systems and Platforms (WP) Review Committee Proposal Downselect Meeting

September 22-23
ESTCP Sustainable Infrastructure (SI) Review Committee Proposal Downselect Meeting

September 27-29
ESTCP Environmental Restoration (ER) Review Committee Meeting

OCTOBER 2005

October 18-20
SERDP Scientific Advisory Board (SAB) Meeting

NOVEMBER-DECEMBER 2005

November 29-December 1
SERDP and ESTCP's Partners In Environmental Technology Technical Symposium & Workshop, Marriott Wardman Park Hotel, Washington, D.C.

RELATED CONFERENCES & EVENTS

August 1-4
14th Annual ITAM Workshop
Indianapolis, Indiana

For more information, visit http://srp.army.mil/public/home.aspx.

August 7-12
90th Annual Ecological Society of America (ESA) Meeting
Montreal, Canada

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

August 22-25
2nd DoD Sustainable Ranges Initiative Conference & Exhibition
San Antonio, Texas

For more information, visit www.rangecon.org or send an e-mail to rangecon@battelle.org.

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