PARTNERS IN ENVIRONMENTAL TECHNOLOGY

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DoD EPA DOE SERDP Strategic Environmental Research and Development Program

ESTCP

INFORMATION BULLETIN

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Standard QA/QC Software Tool Introduced to UXO Community

The introduction of digital geophysics in recent years has revolutionized the methods used to detect, characterize, and remediate sites contaminated with unexploded ordnance (UXO). The transition from traditional "mag & flag" to Digital Geophysical Mapping (DGM) has produced a data stream that did not previously exist. The quality of field data can be highly variable with regard to navigation accuracy, line spacing, noise levels, and other parameters that affect the usefulness of the data. To ensure that data quality meets the government's specifications and that remediation is consistent with project objectives, ESTCP has sponsored the development of a standard software package of tools to assess data quality *[Quality Control/Quality Assurance Software for Digital Geophysical Mapping (UX-0131)]*.

The U.S. Army Corps of Engineers, Engineering and Support Center, Huntsville has been developing Quality Assurance/Quality Control (QA/QC) techniques for evaluating data from geophysical investigations. Beginning in 2001, as part of the ESTCP effort, Geosoft Incorporated and the Huntsville Center entered into a cooperative research and development agreement, or CRADA, to create a series of QA/QC tools. These tools have been incorporated as modules in the Geosoft Oasis montaj™ software package, which is the industry standard for data storage and interpretation. They can be used in a limited fashion under the free Oasis montaj™ interface, but full capability requires purchase of the licensed product. The QC module, developed for widespread distribution to Department of Defense (DoD) contractors, contains standard data quality checks identical to those that will be used by the government for assessment of field data. The QA module, developed for quality assurance of contractor's data by government project managers, also contains data for blind checks of contractor performance.

See QA/QC SOFTWARE, page 5

PARTNERS IN ENVIRONMENTAL TECHNOLOGY TECHNICAL SYMPOSIUM & WORKSHOP

"Meeting DoD's Environmental Challenges: Sustaining Our Ranges; Reducing Environmental Liabilities"

December 2-4, 2003
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 to address increasingly complex environmental challenges. Take a look at the list of technical sessions...

- **Challenges of Dense Non-Aqueous Phase Liquid (DNAPL) Source Zone Remediation**
- **Monitored Natural Attenuation of Chlorinated Solvents**
- **Perchlorate Monitoring and Treatment**
- **Advanced Electromagnetic Induction (EMI) for Unexploded Ordnance (UXO) Detection and Discrimination**
- **Wide Area Unexploded Ordnance (UXO) Characterization**
- **Range Impacts Inside and Outside the Fence**
- **Indicators for Range Carrying Capacity**
- **Heavy Metal-Free Corrosion Protection**
- **Environmentally Benign Alternatives to Heavy Metals Plating**
- **Environmental Impacts of Munitions on Ranges**
- **Bioavailability of Contaminants in Sediments**
- **Environmentally Safe Fire Suppression Systems**

For updated Symposium information, visit one of our web sites (www.serdp.org or www.estcp.org) or call (703) 736-4548.

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.

SUCCESS STORY

A-LIX™ Project Selected as One of Top 100 New Technologies

Electrolytic hard chrome (EHC) is widely used within the Department of Defense (DoD) and industry for metal plating, corrosion control, and surface finishing requirements. However, the plating process generates rinsewater contaminated with hexavalent Chromium [Cr (VI)], which is toxic, and, therefore, federal discharge limits require its removal from wastewaters prior to discharge. The current technology to remove Cr (VI) involves reduction of Cr (VI) to trivalent chromium [Cr (III)] followed by precipitation as chromium hydroxide. Although the reduction and precipitation process is effective, it generates large amounts of hazardous sludge, representing the single largest type of hazardous waste at many DoD maintenance facilities. For example, it has been estimated that treating chrome-contaminated wastewater at 14 sites across the DoD produces approximately 2,000 tons of sludge annually, costing millions of dollars in hazardous sludge handling and disposal.

The high cost of handling Cr (VI) in wastewater and the associated hazardous sludge generation is the key reason for DoD's need to eliminate its use. While DoD and others are evaluating alternatives to Cr (VI), it is still the material of choice for corrosion resistance. Until all use of chromium is eliminated, chromium discharges will continue. Therefore, an improved Cr (VI) removal technology is needed in the interim.

The A-LIX™ system, pictured at left, removes hexavalent chromium [Chromium (VI)] from wastewater by Anion Liquid Ion Exchange.

A team of scientists from Battelle, Columbus, Ohio, and the Air Force Research Laboratory, through ESTCP project *Removing Chromium (VI) from Wastewater by Anion Liquid Ion Exchange (A-LIX™) (CP-0001)*, have successfully demonstrated a process for chromium separation and concentration for recycling. The use of A-LIX™ is a novel extension of liquid-liquid extraction processes common to the chemical and metallurgical industries. Ion pairing is the primary extraction mechanism that selectively removes the Cr (VI) anion from dilute aqueous solution into an oil-soluble extractant in a closed-loop process. The chromate anion is later stripped from the extractant phase and the chromium is concentrated as sodium chromate. The A-LIX™ process produces a clean water stream that meets chromium discharge requirements, eliminates the need for a reducing agent, and drastically reduces plating shop wastes. A-LIX™ technology also may eventually lead to effective recycle and reuse of process waters.

The goal of the ESTCP project was to reduce the Cr (VI) concentration in the aqueous stream below 0.3 mg/L. Demonstration/validation tests showed a Cr (VI) extraction efficiency of 99+% allowing the production of a ≤ 0.3 mg/L Cr (VI) level in the product water under normal operating conditions. The production of a useful concentrate using the compact, automated A-LIX™ system was achieved and the concentrate was recycled successfully.

Researchers working on the project successfully constructed a portable, demonstration-scale unit to process more than 400,000 gallons of plating shop wastewater from Warner Robins Air Logistic Center (WR-ALC) and Watervliet Army Arsenal (WAA). In addition to demonstrating a 99+% removal of Chromium (VI) from wastewater, the A-LIX™ technology demonstrated a number of other advantages over alternative treatment technologies, including moderate capital costs and low operating costs; suitability for multiple-site application; an estimated rate of return between 20 and 40% with an investment payback period projected at 2 to 4 years for a typical A-LIX™ system; and an ability to reuse or recycle extracted Chromium (VI).

Based on its demonstrated potential, the A-LIX™ technology was selected by *R&D Magazine* as one of the Top 100

See A-LIX™ TECHNOLOGY, page 4

SERDP
Strategic Environmental Research and Development Program

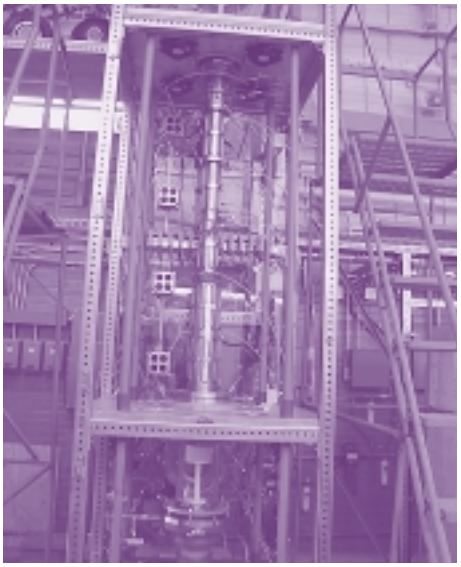
SUCCESS STORY

SERDP Project Develops Chrome-Free Green Gun Barrel Coatings

The U.S. Armed Forces currently use chrome-plated gun barrels in their weapon systems. The chromium coating protects the barrel's bore surface against the harsh effects of hot propellant gases and the mechanical effects of projectiles during firing. Chrome is a heavy metal, and the chromic acid used in the deposition process is a hazardous substance because it contains hexavalent chromium, a known carcinogen. In addition to the exposure problem this method poses, a considerable amount of hazardous waste is generated resulting in excessive disposal costs. The Army attributes 8% of gun barrel production costs to environmental compliance costs associated with chromium. Using the current chrome deposition process, environmental costs to replace the existing large caliber gun barrel stockpile exceeds $10 million. Executive Order (EO) 13148, Part 2, Sections 203, 204, 205, 502, and 503, requires a 50% reduction in the use of hexavalent chromium (primary component of electro-deposition) by December 31, 2006. Developing environmentally friendly, erosion-resistant barrel coatings is one way by which DoD can extend the service life of gun barrels, meet increasingly stringent environmental requirements, and increase operational capability with limited assets.

Through SERDP, EPA, DoD, and DOE are pursuing an alternative method for coating the gun barrels. The Army's Benet Laboratories in upstate New York is the lead in this effort with the Navy (Naval Air Warfare Center - China Lake), the Air Force (Eglin Air Force Base), the Army's Construction Engineering Research Laboratory (CERL) at Champaign, Illinois, EPA (National Risk Management Research Lab - Cincinnati, Ohio), and DOE (Battelle Pacific Northwest Labs - Richfield, Washington) all serving as key participants. The *Green Gun Barrel Program*, initiated in 1999, has developed an innovative, nonaqueous, nonpolluting method for applying environmentally safe coatings to protect gun barrels and replace chromium. The team has developed a physical vapor-deposition technique called cylindrical magnetron sputtering (CMS). The CMS process has been developed and economically demonstrated by depositing a tantalum metal coating onto the bore of 45 mm medium caliber gun barrels. This technology was a follow-on to Benet's successful triode-sputtering technology demonstration in which environmentally friendly triode sputtered tantalum was deposited onto a liner inserted into a 20 mm Gatling Gun. The barrel was tested with 1,500 rounds firing 10 groups of 150 rounds each at 1,000 rounds per minute. Minimal wear was measured with little to no degradation of the coating. Because of the length constraints of the triode-sputtering process, the SERDP tri-service team modified the technology to cylindrical magnetron sputtering.

Researchers working on the *Green Gun Barrel Program (PP-1074)* have developed the vacuum and deposition technologies necessary to deposit high melting point refractory metals onto the inner surface of gun barrels. Control systems with the ability to alter such properties as coating phase, morphology, and hardness have been developed so that coatings may be tailored to various requirements. Gun trials were conducted to validate "equivalency or better" performance of this new technology when compared to the current chromium baseline. The team test fired two coated 45 mm barrels on the CASIUS gun system that was designed to simulate the same thermal and mechanical stresses experienced in the 120 mm tank gun over the first meter of travel.



The Green Gun Barrel program has developed the cylindrical magnetron sputtering (CMS) process to coat the interior diameter of gun barrels with a non-chromium replacement.

During this program, researchers achieved techniques for depositing evenly distributed coatings (both circumferentially and axially) by developing a unique magnetic field management apparatus not previously conceived for this application. In addition, techniques and an apparatus for precleaning both the barrels and the targets within a vacuum environment were developed and patented. Techniques for depositing a repeatable, crack-free, dense, and ductile coating also were developed.

As a result of all these efforts, sputtered tantalum has been demonstrated as a potential replacement technology for the electrodeposition of chromium. This technology is now being transitioned to large caliber guns through an Army MANTECH program.

For further information about this project, please contact Mr. Michael J. Audino, Army Armaments Research, Development and Engineering Center, Benet Laboratories, Watervliet, NY, at (518) 266-5740 or via e-mail at mjaudino@pica.army.mil. ◆

TECH NOTES

◆ CHLORINATED SOLVENT EXPERT PANEL RESULTS FEATURED IN NATIONAL PUBLICATION

The journal of *Environmental Science & Technology* (ES&T) recently highlighted the SERDP and ESTCP expert panel workshop that convened on August 6-7, 2001, to evaluate the research and development (R&D) priorities in the area of chlorinated solvent source zone remediation. In summary, the article describes the nature of the source zone problem and identifies the high- and moderate-priority R&D needs for science and technology as determined by the expert panel.

The full journal article is available in *Environmental Science & Technology* (*Stroo, H.F, Unger. M., Ward, C.H., Kavanaugh, M.C., Vogel, C., Leeson, A., Marqusee, J.A., and Smith, B.P.* June 1, 2003. Remediating Chlorinated Solvent Source Zones. 224A-230A).

For the complete workshop report, please refer to Expert Panel Workshop: Research and Development Needs for Cleanup of Chlorinated Solvent Sites, (http://www.estcp.org/documents/techdocs/chlorsolvcleanup.pdf).

◆ WHITE HOUSE RECOGNIZES ESTCP-FUNDED BIOBARRIER

The ESTCP Methyl Tertiary Butyl Ether (MTBE) Biobarrier Team recently was awarded the prestigious White House Closing the Circle Award for 2003 in the Environmental Preferability Category. During his announcement of the winners on April 22, 2003, Federal Environmental Executive John Howard noted, "This year's honorees have heeded President Bush's call for the federal government to lead by example, be a good neighbor, and be a good steward of our resources. These outstanding programs demonstrate our federal work force is committed to improving its environmental performance and protecting our resources through such actions as establishing environmental management systems; increasing the purchase of green products and services; designing, constructing, and operating buildings using sustainable principles; and reducing the generation of wastes."

The ESTCP MTBE Biobarrier Demonstration represents the first proven, low-cost solution for remediation of the gasoline component, MTBE, now recognized as a threat to drinking water resources across the nation. It is a breakthrough technology for a critical groundwater problem facing the Department of Defense, other government agencies, and thousands of underground storage tank owners. This project is an outstanding example of successful technology transfer from private industry to the government, then back to private industry. Similar technology now is being used to remediate MTBE-contaminated groundwater at gas stations across the United States. The results to date are impressive, demonstrating significant 99% MTBE removal as well as sustained microbial activity. The overwhelming success of the demonstration project convinced the Los Angeles Regional Water Quality Control Board to support the installation of two additional biobarriers as the final remedy for the Naval Base Ventura County (NBVC) plume. At the NBVC alone, use of this new technology led to a cost savings to the taxpayers of approximately $34 million.

For more information, please contact Ms. Karen Miller, Naval Facilities Engineering Service Center, Port Hueneme, CA, at (805) 982-1010 or via e-mail at millerkd@nfesc.navy.mil.

◆ NOVEL TECHNOLOGY BEING USED FOR TCE CLEANUP

Researchers from the Naval Facilities Engineering Service Center (NFESC) and Stanford University began treatment of a TCE-contaminated site at Edwards Air Force Base (EAFB), California, through a destruction mechanism (called hydrodechlorination) using palladium (as a catalyst) and hydrogen gas (dissolved in the groundwater) to quickly destroy halogenated contaminants without the formation of toxic intermediates. The project, funded by ESTCP, involves routing contaminated groundwater through palladium-containing reactors that reside inside horizontal flow treatment wells within the contaminated plume. To date, two horizontal flow treatment wells and two reactors have been installed at the EAFB site. The reactors contain alumina spheres coated with 2% palladium metal. Each treatment well is screened over two intervals, with one well pumping in an upflow mode, the other in a downflow mode. Working in tandem, the wells create a zone in which contaminated water from upgradient is captured and treated. Recycling contaminated water between the two wells leads to higher contaminant removal efficiencies than could otherwise be achieved. A preliminary run demonstrated higher than 95% TCE removal with only a single reactor pass. When the flow was 2.8 gpm and the influent TCE concentrations were 0.90 ± 0.07 mg/L, the effluent TCE concentration was 0.02 ± 0.02 mg/L. At a lower flow rate (2.4 gpm), when the influent TCE concentration was 0.88 ± 0.12 mg/L, the effluent TCE concentration was non-detectable (all 3 replicates).

The reactors will operate ex situ for the first 4 months of the demonstration. Once all maintenance and operation issues have been identified, the reactors will be deployed in situ. The demonstration will be completed by August 2004.

For further information, please contact Ms. Carmen LeBron, NFESC, Restoration Development Branch, Port Hueneme, CA, at (805) 982-1616 or via e-mail at lebronca@nfesc.navy.mil. ◆

A-LIX™ TECHNOLOGY, from page 2

New Technologies for 2002. The results of this ESTCP demonstration provide a basis for implementation of the A-LIX™ process in plating shops and metal treatment operations throughout the DoD. Currently, construction is underway at Hill Air Force Base for a full-scale, 43,000 gal/day unit. Implementation of A-LIX™, in combination with elimination of chromic acid-based stripping, will have a projected annual savings of approximately $1 million and a 9-month payback period. The unit is scheduled to come online in Fall 2003.

For more information about this technology, please contact Mr. Nick Conkle, Battelle, Columbus, Ohio, at (614) 424-5616 or via e-mail at conkle@battelle.org. ◆

Sustainable Range Workshop Findings Continue to Guide SERDP R&D Initiatives

"Our vision is to build and sustain ranges and operating areas to support all present and future mission elements while maintaining public confidence and protecting natural and cultural resources."

This is the vision statement provided to approximately 30 members of the Department of Defense military training and testing range community last summer when they attended a SERDP-sponsored Sustainable Range Workshop. SERDP invited military representatives from across the country representing the Office of the Secretary of Defense (OSD), the Major Command level, and the installation level, including range operators, trainers, testers, and planners. The workshop was designed to obtain direct input from these military representatives to identify critical needs associated with maintaining range sustainability.

To focus efforts on high-priority, DoD-unique research needs, attendees met in smaller workgroups to discuss and assess key aspects of range sustainability. The main products of this workshop were Need Statements grouped into the following categories: Threatened and Endangered (T&E) Species; Invasive Species; Land Use; UXO; Munitions/Other Constituents; Noise; Air Emissions; and Water Quality. For each Need Statement, workshop attendees developed research goals and objectives.

Following the workshop, the Need Statements were the basis for a number of SERDP FY 2004 Statements of Need (SON), and once again they are being considered for the development of FY 2005 SONs to be released in November 2003 as part of the FY 2005 Solicitation. They also were used to help identify technical session topics for the 2002 SERDP and ESTCP *Partners in Environmental Technology Technical Symposium & Workshop*. These technical sessions in turn produced a number of ideas that SERDP staff have used to further evaluate and clarify research gaps.

Another outcome of last summer's workshop was the identification of special studies needed to identify and quantify research gaps and to assess the state of the technology for specific range-related environmental issues facing DoD. SERDP is using all the information generated from the Range Workshop to further address range sustainability issues and to guide SERDP's long-term investment strategy.

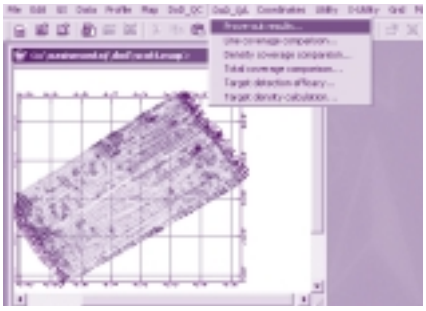
For additional information, please refer to the Need Statements on the SERDP web site at www.serdp.org/general/publications/NeedStatements.pdf. ◆

QA/QC SOFTWARE, from page 1

In January 2002, the QC module of the software package was peer reviewed by contractors involved in data collection, and subsequently, enhancements were made prior to the release of the software for field use. A free training workshop was held at the Huntsville Center from April 16-19, 2002, to make these tools available to all contractors conducting ordnance and explosive (OE) geophysics and to encourage their use in the field. An announcement of the public release of the QA/QC software was made to the UXO community early this year. A second training workshop, including sessions for both contractors and the government, is planned for October 2003 at the Huntsville Center. To encourage transition of this software to the UXO community, free software support is being funded by ESTCP and the Huntsville Center. To encourage regulatory acceptance, the QA/QC software has been presented to the Interstate Technology Regulatory Council (ITRC).

Ongoing work on this project will transition data processing algorithms developed under other SERDP and ESTCP projects. The Oasis montaj™ package will provide a standard software platform for detection and discrimination algorithms to be made available to the UXO community. These algorithms are being combined with enhancements already made to the Oasis montaj™ package to support the QA/QC modules that improve the manipulation of sensor data and verify data quality. Together they will provide a means for ongoing UXO remediation projects to exploit advanced data analysis techniques in the field.

This new ESTCP-funded QA/QC tool set, now being used in the field by OE contractors and government managers, enhances all aspects of the UXO site survey process. It greatly improves the utilization of field data by identifying and correcting instrument and acquisition errors. The software package also addresses repetitive data quality issues associated with resurveying and will greatly improve productivity in UXO investigations. The common software platform allows for sharing algorithms developed by multiple parties. Standard tests and tools developed under this project will enable the contractors tasked with collecting, processing, and analyzing the data to be more effective in meeting government data quality standards and ultimately will help reduce the cost of UXO remediation activities.



The ESTCP-funded QA/QC tool set within Oasis montaj™ is meeting government data quality standards for UXO investigations.

For more information about this project, please contact Mr. Scott Millhouse, U.S. Army Corps of Engineers, Engineering and Support Center, Huntsville, Huntsville, AL, at (256) 895-1607 or via e-mail at scott.d.millhouse@hnd01.usace. army.mil. ◆

Program Development Update

Recent Congressional committee action results indicate that Congress is fully supportive of the current SERDP budget request of $47.1 million for FY 2004. Similarly, Congressional appropriation committees have concurred with the ESTCP FY 2004 budget request of $36.15 million, a 27 percent increase from that received in FY 2003. These encouraging actions will facilitate the program development process for both programs. At this time, SERDP and ESTCP FY 2004 proposals are entering their final review stage, and announcements of project selection/contract award should be made by November 1.

SERDP

In early May, the independent review of all proposals was completed. Of the 203 proposals received by SERDP and subjected to independent peer review, 101 were sent on to the multiagency Technology Thrust Area Working Groups (TTAWG). In late June, the TTAWGs deliberated to select the very best of these competitive proposals. While considering transition potential, cooperative development, and cost issues, the TTAWGs integrated the comments of the peer reviewers regarding technical merit and personnel to develop a priority listing of proposals that could best meet the requirements as stated in each of the 23 Statements of Need. This prioritized list was forwarded by each TTAWG Co-Chair to the SERDP Technical Director.

The SERDP Technical Director and Staff forwarded these top proposals to the SERDP Scientific Advisory Board (SAB) for the final technical review, scheduled to be held this year in September and October. Using the recommendations of the SAB, the Executive Director will integrate these New Start projects into the continuing project list to formulate a draft FY 2004 Program Plan. This Plan will be submitted first to the Executive Working Group in mid-September, then to the SERDP Council for final approval in late September. Approved projects can expect their funds about 2 to 4 months after Congress appropriates FY 2004 funding. Unsuccessful bidders will be notified and provided Peer Reviewer comments upon request.

ESTCP

In June, the ESTCP Review Committee reviewed 89 Department of Defense preproposals and selected 32 of these preproposals to return with a full proposal and briefing to the committees at their Phase II reviews in September. The full proposals, a new requirement for federal submitters this year, will serve to provide sufficient technical detail on the proposed demonstration to the Review Committees. In a parallel effort, 101 preproposals that were submitted by either industry, academia, or non-DoD federal organizations and passed initial relevancy screening were linked with DoD points-of-contact who assisted the project leads to identify DoD sites with relevant DoD problems. ESTCP has asked 26 of these proposers to submit full proposals and brief them at the Phase II reviews in September. The ESTCP Review Committees will create a prioritized list of projects for the ESTCP Director's consideration when developing a draft FY 2004 Program Plan. This Plan will be submitted, after Congress has appropriated funding, to the Deputy Under Secretary of Defense for Installations and the Environment for final approval. All bidders will receive notification of the Review Committees' results. ◆

Four New Members Join SERDP's Scientific Advisory Board

SERDP recently welcomed four new members to its SAB – Dr. Paul T. Anastas, Dr. Ann M. Bartuska, Dr. Jeffrey J. Daniels, and Dr. Jeffrey J. Siirola.

Dr. Anastas is the Assistant Director for Environment in the White House Office of Science and Technology Policy. Previously, he held several different positions with the U.S. Environmental Protection Agency, most recently as the Chief of the Industrial Chemistry Branch and Director of the *U.S. Green Chemistry Program*. A two-time recipient of the Vice President's Hammer Award (1998, 2000), Dr. Anastas also was awarded an EPA Silver Medal for Design and Development of EPA's Green Chemistry Program in 1997 and an EPA Bronze Medal for Development of a Green Chemistry Expert System in 1999. Dr. Anastas holds a Ph.D. in organic chemistry from Brandeis University and has published nine books and coauthored numerous articles, papers, and chapters.

Following a more than 10-year career with the U.S. Department of Agriculture Forest Service, **Dr. Bartuska** joined the Nature Conservancy as the Executive Director of the Invasive Species Initiative. She is also the current president of the Ecological Society of America, one of many professional organizations in which she participates, and has been recognized with several awards. A coauthor of numerous book chapters, proceedings, and journal articles, Dr. Bartuska holds a Ph.D. in biology from West Virginia University.

Dr. Daniels is the Associate Dean of the College of Mathematical and Physical Sciences at Ohio State University. He has served on many review panels and has held leadership positions in numerous professional

See NEW MEMBERS, page 7

PROGRAM NOTES

- **MARK YOUR CALENDAR FOR SERDP AND ESTCP'S ANNUAL PARTNERS IN ENVIRONMENTAL TECHNOLOGY TECHNICAL SYMPOSIUM & WORKSHOP SCHEDULED TO BE HELD DECEMBER 2-4, 2003**, at the Marriott Wardman Park Hotel, Washington, DC. To register or to learn more about this event, visit either web site (www.serdp.org or www.estcp.org), call our contact line at (703) 736-4548, or send an e-mail to partners@hgl.com.

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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 fourth quarter of government FY 2003 are due by October 15, 2003. For assistance, contact your Program Manager Assistant.
- **THE SERDP SCIENTIFIC ADVISORY BOARD (SAB)** is scheduled to meet in Arlington, Virginia, October 1-3 to review primarily New Start projects. Contact Veronica Rice at (703) 696-2119 or via e-mail at Veronica.Rice@osd.mil for additional information.
- **THE FY 2005 SERDP CORE SOLICITATION AND FY 2005 SERDP EXPLORATORY DEVELOPMENT (SEED) SOLICITATION** will be released on or about November 13. Watch the SERDP web site (www.serdp.org under the Funding & Opportunities link) for specifics about the solicitations and the schedules.

E◆S◆T◆C◆P

- **QUARTERLY REPORTS** for the fourth quarter of government FY 2003 are due October 15, 2003. For assistance, please contact your Program Manager.
- **NEW PUBLICATIONS NOW AVAILABLE ON THE ESTCP WEB SITE** (www.estcp.org)

Cost and Performance Reports:

Cleanup

- *In-Situ Bioremediation of MTBE in Ground Water (CU-0013)*
- *In-Situ Remediation of MTBE Contaminated Aquifers Using Propane Biosparging (CU-0015)*

UXO

- *Geonics EM-63 Multi-Channel EM Data Processing Algorithms for Target Location and Ordnance Discrimination (UX-0035)*

NEW MEMBERS, from page 6

organizations related to geophysical science issues, including being the founding president of the Environmental and Engineering Geophysical Society. Author or coauthor of more than 90 scientific publications and articles and editor for several professional publications, Dr. Daniels holds a Ph.D. in geophysical engineering from the Colorado School of Mines.

Dr. Siirola is a Technology Fellow in the Research Division at the Eastman Chemical Company. He is the developer of the Adaptive Initial DEsign Synthesis (AIDES) conceptual flowsheet invention procedure and software. He also has published more than 120 reviews, papers, articles, chapters, and presentations and also served as editor or coeditor of several proceedings and coauthored a textbook. Dr. Siirola holds a Ph.D. in chemical engineering from the University of Wisconsin-Madison. ◆

PARTNERS IN ENVIRONMENTAL TECHNOLOGY

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

INFORMATION BULLETIN

SUMMER 2003 NUMBER 17

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

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C◆A◆L◆E◆N◆D◆A◆R

FOR SERDP AND ESTCP

OCTOBER 2003

October 1-3
SERDP Scientific Advisory Board (SAB) meeting

October 7-9
Cleanup In-Progress Review (IPR) meeting

October 15
Compliance In-Progress Review (IPR) meeting

October 15
SERDP Quarterly Progress Reports due for the fourth quarter of government FY 2003

October 15
ESTCP Quarterly Reports due for the fourth quarter of government FY 2003

October 16-17
Pollution Prevention In-Progress Review (IPR) meeting

October 21-22
UXO In-Progress Review (IPR) meeting

NOVEMBER 2003

November 13
FY 2005 SERDP Core Solicitation and FY 2005 SERDP Exploratory Development (SEED) solicitation to be released on or about this date

DECEMBER 2003

December 2-4
Partners in Environmental Technology Technical Symposium & Workshop
Washington, D.C.
Sponsored by SERDP and ESTCP.

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

RELATED CONFERENCES & EVENTS

October 15-16, 2003
Meeting of the Remediation Technologies Development Forum (RTDF) Permeable Reactive Barriers (PRB) Action Team
Niagara Falls, New York

For more information visit http//:www.rtdf.org/public/permbarr/minutes.

October 20-23, 2003
19th Annual International Conference on Soils, Sediments, and Water
Amherst, Massachusetts

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

October 25-30
The First International Conference on Optimized Site Remediation: Technologies, Processes, and Strategies for Attaining Cost-Effective Closure

The Eighth International Conference on TiO_2 Photocatalysis: Fundamentals & Applications

The Ninth International Conference on Advanced Oxidation Technologies for Water and Air Remediation
Montreal, Quebec, Canada

For more information about these three conferences, visit www.redoxtech.com.

November 3-8, 2003
Invasive Plants in Natural and Managed Systems: Linking Science and Management
and
7th International Conference on the Ecology and Management of Alien Plant Invasions
Ft. Lauderdale, Florida

For more information, visit http://www.esa.org/ipinams-emapi7/.

November 9-13, 2003
SETAC 24th Annual Meeting in North America
Austin, Texas

For more information, visit http://www.setac.org/austin.html.

December 8-11, 2003
14th Annual International Workshop on Alternatives to Toxic Materials in Industrial Processes
Scottsdale, Arizona

For more information, visit http://www.exchangemonitor.com/samples/4_page_dec_2003.pdf.

January 5-8, 2004
Sustainable Range Management Conference
New Orleans, Louisiana

For more information, visit www.battelle.org/rangecon.

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