PARTNERS IN ENVIRONMENTAL TECHNOLOGY

SUMMER 2001
NUMBER 9

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ESTCP

INFORMATION B•U•L•L•E•T•I•N

ESTCP & SERDP PROJECTS HIGHLIGHT SUCCESSES AT THE UXO/COUNTERMINE FORUM 2001

The UXO/Countermine Forum 2001: "Meeting Transformation Challenges" was held April 9-12 in New Orleans, LA. The diverse lineup of speakers, technical papers, and exhibits drew approximately 1,000 attendees from government, commerce, and academia from around the world. The Forum is the Department of Defense's (DoD) preeminent conference on UXO and countermine technology, programs, and partnerships. The conference brings together researchers, developers, manufacturers, and policy makers from the state, federal, and international arenas to meet and share ideas and progress on UXO and mine detection and clearance. The Department of Defense Explosives Safety Board (DDESB), the U.S. Army Environmental Center (USAEC), and the Office of the Program Manager for Mines, Countermine and Demolitions, as well as SERDP and ESTCP underwrote this year's event.

Many SERDP and ESTCP funded efforts were represented among the more than 140 technical papers presented during the four-day conference. One ESTCP project, *Demonstration of Advanced UXO Detection and Discrimination Technology*, highlighted its recent accomplishments. This project is a joint Navy (NAVEODTECHDIV) and Army (ERDC-WES, AEC) effort to design, conduct, and analyze a series of realistic demonstrations that build upon the results of the Jefferson Proving Ground Phase IV (JPG IV) demonstrations and provide operationally realistic cost and performance data needed to determine if these advanced technologies are ready to deploy to difficult UXO environments such as the Kaho'olawe sites.

The focus of this ESTCP project is to demonstrate advanced electromagnetic induction detection and discrimination technologies at a site with high magnetic noise levels. The goal is to transition the most

See UXO FORUM, page 7

THE PARTNERS IN ENVIRONMENTAL TECHNOLOGY TECHNICAL SYMPOSIUM & WORKSHOP

"Building on Past Successes to Address Emerging Issues"

GENERAL INFORMATION

The Partners in Environmental Technology Technical Symposium and Workshop sponsored by SERDP and ESTCP is scheduled to be held November 27-29, 2001, at the Marriott Wardman Park Hotel in Washington, D.C.

This year's technical program "Building on Past Successes to Address Emerging Issues" will feature comprehensive sessions that will illustrate how the Department of Defense is addressing emerging environmental issues by building on past successes in the development of innovative environmental technologies.

SESSION TOPICS

- Demonstrations of Emerging Unexploded Ordnance (UXO) Technologies
- Novel Technologies and Data Processing to Locate and Discriminate Buried Unexploded Ordnance
- Environmental Impacts of Energetic Materials on Ranges
- Remediation/Site Characterization of Energetic Contaminants
- Remediation of Chlorinated Solvents
- Cleaning and Inspection of Weapons Systems
- Estuarine Water and Sediment Quality
- Encroachment—Ecological Aspects
- Invasive Species
- Environmental Design for Maintainability
- Environmentally Friendly Corrosion Protection

CALL FOR POSTER ABSTRACTS

There are a limited number of spaces available to display poster presentations of technologies that relate to the Symposium and Workshop technical session topics (listed left). Those interested in being considered for poster space should refer to the abstract guidelines that are posted at www.serdp.org and www.estcp.org. Both federal and non-federal submitters will be considered.

Abstracts are due August 24, 2001.

There is no additional charge for poster space.

S•U•C•C•E•S•S STORIES

SERDP-funded research and development efforts and ESTCP-funded demonstration and validation activities continue to provide a rapidly increasing number of outstanding technical 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

SERDP Projects Work to Unlock the Key to Biodegradation of Ammonium Perchlorate

Ammonium perchlorate is an oxidizer and the primary ingredient in solid propellants for rockets and missiles. Because of its limited shelf life, inventories of ammonium perchlorate must be replaced periodically. As a result, large amounts of waste propellant are generated during the manufacturing, maintenance, and disposal of weapon systems. Ammonium perchlorate also has been used in explosives, fireworks, matches, and airbag inflators. Initial record searches indicate that perchlorate has been manufactured, used, or shipped to facilities in at least 43 states. Following the development of a more sensitive analytical procedure for perchlorate in 1997, it has been detected in surface or groundwater at sites in California, Texas, Nevada, Utah, Arkansas, Maryland, and New York. Although no national drinking water standard has been established yet, several states have adopted a provisional action level of 18 ppb.

Because the perchlorate ion is nonvolatile and highly soluble in water, conventional water treatment technologies, such as filtration, sedimentation, air stripping, or activated carbon, are ineffective. Innovative technologies under development include reverse osmosis and ion exchange in addition to biological processes that hold promise for both aboveground and in-situ applications. To address this need for innovative remediation strategies, SERDP is funding three interrelated projects in which investigators from Southern Illinois University, Envirogen, Inc., and GeoSyntec, Inc., with support from the Naval Facilities Engineering Support Agency are developing a biological approach for the in-situ degradation of perchlorate.

Through SERDP project CU-1162: *In-Situ Bioreduction and Removal of Ammonium Perchlorate*, researchers at Southern Illinois University are gaining a better understanding of the microbial processes involved in perchlorate reduction. During the first phase of its investigation, the project team has isolated and characterized perchlorate-reducing bacteria from a number of Department of Defense contamination sites. To date, more than 30 microorganisms that contain the enzyme needed for perchlorate reduction have been isolated and identified.

It appears that perchlorate reducing bacteria are ubiquitous in the environment. Batch experiments using several pure cultures have shown that they are all able to reduce perchlorate concentrations to below the detection level (<4 µg/L). Future work will determine the geochemical parameters that may inhibit the expression of the chlorite dismutase enzyme and how environmental factors may impact biodegradation rates. Molecular tools also will be developed for use in characterizing the microbial ecology at perchlorate contaminated sites.

Efforts with Envirogen and GeoSyntec are designed to take the science of perchlorate reduction to the field by developing approaches for the in-situ bioremediation of perchlorate. Under CU-1163: *In-Situ Bioremediation of Perchlorate*, Dr. Paul Hatzinger from Envirogen is conducting microcosm and column studies to determine the efficiency of several electron donors and the effect of various geochemical parameters and competing terminal electron acceptors on perchlorate reduction. Aquifer material from the same Department of Defense sites studied by Dr. Coates of Southern Illinois University is being used for this effort. Results to date indicate that the choice of electron donor is site specific, although acetate and lactate were generally effective in stimulating perchlorate reduction in most samples tested. Low pH (<5.7) and the presence of oxygen inhibited perchlorate reduction in these studies. As expected from the reaction thermodynamics, nitrate reduction was preferential to perchlorate reduction in the microcosm studies which indicates that the competitive effects of nitrate for added electron donor need to be considered in any field-scale application.

Work in the coming year will focus on column studies using site material from the Longhorn Army Ammunition Plant, TX. These studies are designed to define the degradation kinetics and electron donor requirements using a flow-through system that more realistically mimics in-situ conditions.

See PERCHLORATE, page 4

SERDP
Strategic Environmental Research and Development Program

SUCCESS STORY

Red-Cockaded Woodpecker Acclimates to Military Noise

The Red-Cockaded Woodpecker (RCW) is a listed endangered species as well as a keystone species whose subsistence impacts at least 30 other critical animals and plants within the fire-adapted, mature pine forest habitat in the southeastern United States. Department of Defense units train on land that is sensitive habitat for RCW. These training installations, 16 in total, must contend with the conflicting interests of RCW management requirements and optimization of training land to maintain military readiness.

Because of the lack of information available on the impact of training exercises on the RCW, severe training restrictions were imposed on military installations in the southeast U.S. in the early 1990s. The U.S. Army, recognizing the need to coordinate with the U.S. Fish and Wildlife Service (USFWS) to develop more realistic guidelines for training restrictions and adaptive management practices for the RCW, proposed guidelines based on anecdotal evidence that suggested noise (and other disturbances) from military activities has minimal impact on the RCW. The guidelines were approved in 1996, contingent, in part, on a rigorous hypothesis testing of the impacts of military noise on the RCW and a review of the guidelines every five years. In response to this contingency, SERDP has funded the U.S. Army Corps of Engineers (USACE) since 1998 to test the response of the RCW to a range of military training noise events, such as artillery, small arms, helicopter, and maneuver noise.

Through the SERDP-funded project, researchers at the USACE Construction Engineering Research Laboratory have observed and documented the immediate response (e.g., flush from the nest cavity) and individual fitness parameters such as reproductive success of the RCW to specific noise events. To determine the range of normal behavior and hearing of the RCW, baseline behavior data as well as the hearing range and sensitivity were established for undisturbed groups. Dose-response relationships were established between noise level and the probability of proximate RCW response behavior and reproductive success. The experimental design was based on the assumption that if an individual exhibits frequent proximate responses to noise events, then this could lead to a reduction in its overall fitness rate (i.e., survival or reproductive success). A widespread reduction in individual fitness rates could infer a change in the viability of the population.

The project's findings show that the RCW successfully acclimates to military noise events. Depending on the noise level that ranged from innocuous to very loud, the birds responded by flushing from their nest cavities. When the noise source was closer and the noise level was higher, the number of flushes increased proportionately. In all cases, however, the birds returned to the nest within 12 minutes (relatively quickly). Additionally, the noise exposure did not result in any mortality or statistically detectable changes in reproductive success.

Both the U.S. Army and USFWS have evaluated the project and deemed it a huge success for three important reasons: 1) the coordination efforts implemented early in the development of the experimental design allowed for the integration of the knowledge and interests of all concerned parties, 2) the rigorous and defensible nature of the experimental design, and 3) the usefulness and timing of the project's findings. Dr. William Russell, the User Advocate for Noise from the Army Environmental Quality Technology Program, recently commented on the successful outcome of the project. According to Dr. Russell, "The process opened up all avenues of communication and the result is a product that is acceptable to everyone: installation managers, regulators and researchers."

Because of the rigorous design of the experiment, the Army is able to use the findings to support revisions to the 1996 guidelines. Dr. Bert Bivings of the Army's Forces Command stated, "Based on the results of this research, the Army is highly unlikely to be restricted in live fire or pyrotechnic training due to the noise impacts on RCW."

The project, being the first to address military noise impacts on an endangered species, also provides a solid foundation for research for other species studies. Mr. Ralph Costa, the RCW Recovery Coordinator of the USFWS, noted, "I routinely receive calls from various conservation agencies such as the U.S. Marine Corps, U.S. Air Force, Forest Service, and state offices asking for information on noise impacts. Until (the) Army Corps of Engineers conducted their study, I had nothing to give them. Now, we have real information and a solid methodology to offer them."

The principle outcome of this SERDP-funded effort is a thorough authoritative assessment of military noise impacts on RCW. This research supports the sustainability of military lands by providing a knowledge base to defend a reduction in training restrictions and a more judicious management of the RCW. "Based on the findings of this project, the hope is that there will be no restrictions to military training due to noise impacts on RCW," stated Mr. Costa.

For additional information, please contact Dr. Larry Pater, U.S. Army Corps of Engineers, ERDC-CERL, Champaign, IL, at (217) 373-7253, or via e-mail at Larry.L.Pater@erdc.usace.army.mil. ◆

PROGRAM DEVELOPMENT UPDATE

The initial stages of proposal selection, including internal review and independent peer review, have been completed. During late summer months, downselected proposals will be briefed to final review authorities for recommendation to be included in the FY 2002 programs. Final selections will be approved in late September.

SERDP

Having completed an independent peer review, proposals were sent to the four Technology Thrust Area Working Groups (TTAWG) and UXO subcommittee for final review and recommendation to the Executive Director for funding as FY 2002 new start projects. These selected projects will provide a technical briefing to the SERDP Scientific Advisory Board (SAB) in August or September as the last step in SERDP's technical review process. Projects that are requested to brief the SAB would have been notified no later than mid-July. Unsuccessful projects will receive official notification by the end of July. With SAB recommendation for funding, these projects will be incorporated in a draft FY 2002 program plan that will be presented to the multi-agency SERDP Executive Working Group prior to final approval by the SERDP Council in late September.

ESTCP

In late June, the ESTCP Review Committees conducted an initial downselect of both Phase I proposals and those Cleanup preproposals submitted in response to the Broad Agency Announcement (BAA). Phase I proposals selected for Phase II have been notified and are preparing briefings to be provided to the Review Committees at their August meetings. BAA preproposals that were selected have been linked with a DoD liaison and have prepared full proposals and briefings to be provided at the same Review Committee meetings in August. Proposals that are recommended for funding by the Review Committees will be forwarded to the ESTCP Director who will gain final funding approval from the Deputy Under Secretary of Defense for Installations and Environment.

SERDP SUPPLEMENTAL SOLICITATION

As a result of an unanticipated increase in the FY 2002 President's Budget for SERDP, an "out-of-cycle" solicitation has been released requesting proposals for UXO, Cleanup, Compliance, Conservation, and Pollution Prevention technology development. Details and instructions can be found at www.serdp.org. ◆

PERCHLORATE, from page 2

Data from the column studies will be used to develop a kinetic model for in-situ perchlorate degradation. The kinetic model will be incorporated into an existing reactive transport model for use in simulating and evaluating different field-scale treatment scenarios.

Under CU-1164: *In-Situ Bioremediation of Perchlorate-Impacted Groundwater*, Mr. Evan Cox at GeoSyntec is leading an effort, in collaboration with researchers at the University of Toronto, to assess the ability to treat jointly organic co-contaminants as well as the limiting factors in stimulating perchlorate reduction in-situ and to demonstrate the in-situ degradation of perchlorate through a field-scale pilot test. Acetate, molasses, and oleate successfully stimulated perchlorate reduction in batch microcosm tests using aquifer material from six different contamination sites. The acclimation period prior to observing degradation in these experiments ranged from 0 to 60 days. The batch studies also confirmed that nitrate reduction is preferential to perchlorate reduction but, in a few cases, nitrate and perchlorate were coincidentally reduced. It is not readily apparent what the controlling factor(s) are for the coincidental degradation of nitrate and perchlorate.

Currently, this team is continuing the laboratory studies to define the potential interactions between sulfate and perchlorate and also determine the effectiveness of the bioprocess to treat co-contaminants, such as trichloroethylene. A field-scale pilot test is scheduled to get underway during the fall of 2001 at the Aerojet Superfund Site in Sacramento, CA. An extraction-amendment-injection system is being installed to deliver and distribute an electron donor to stimulate the in-situ reduction of perchlorate. The system will be operated and monitored for six months to document its effectiveness.

These three efforts presented collectively represent a successful collaboration between the Department of Defense, academia, and private industry. The ability of the investigators to share samples, bacterial cultures, and results from their individual studies has greatly increased the rate of development of a biological process to the point where it is now ready for field testing. Results from these efforts will be quickly transitioned to future perchlorate remediation work currently being planned for ESTCP.

For more information, please contact the following individuals: for CU-1162, Dr. John Coates, Southern Illinois University, Carbondale, IL, at (618) 453-6132 or via e-mail at jcoates@micro.siu.edu; for CU-1163, Dr. Paul Hatzinger, Envirogen, Inc., Lawrenceville, NJ, at (609) 936-9300 or via e-mail at hatzinger@envirogen.com; for CU-1164, Mr. Evan Cox, GeoSyntec Consultants, Inc., Guelph, Ontario, Canada, at (519) 822-2230 or via e-mail at ecox@geosyntec.com. ◆

SERDP
Strategic Environmental Research and Development Program

SUCCESS STORY

SERDP Project Investigates the Science Behind Chromate Corrosion Coatings and Chromate-Free Alternatives

The production and refurbishment of Department of Defense (DoD) weapons platforms involves the application and removal of corrosion protection coatings. These processes generate large quantities of hazardous wastes that historically have contained chromate compounds and now require increasingly expensive treatment and disposal methods. Growing public concern and regulatory requirements are placing increased limitations on the use of chromates in corrosion resistant coatings. As a result, the DoD and Department of Energy (DOE) have committed to replacing chromate-based metal corrosion protection in current and next generation weapons systems. At present, however, chromate-free conversion coatings do not offer the level of corrosion protection provided by chromate coatings. Therefore, the DoD needs to identify alternate coating chemistries and application methods that do not use or produce toxic substances but which produce coatings with chromate-equivalent performance.

The issue presents significant scientific challenges, in part, because chromate corrosion protection has some rare, and perhaps unique, attributes. Chromate conversion coatings and chromate primer coatings contain large fractions of soluble chromate. This soluble chromate can be leached from the coatings to "heal" coating defects and inhibit corrosion, which yields the exceptionally high corrosion resistance properties of these coatings. To date, no other equivalent coating chemistry consistently achieves the corrosion resistance demonstrated by chromate coatings. It is not yet understood how to duplicate the "self-healing" action thought to be key in chromate corrosion protection.

To address the need for self-healing chromate-free coatings, SERDP has been sponsoring a multi-year research effort aimed at understanding the fundamentals of chromate-based coatings, focusing specifically on their use in the corrosion protection of aluminum alloys. This project, PP-1119: *Critical Factors for the Transition from Chromate to Chromate-Free Corrosion Protection*," is led by Dr. Rudolph Buchheit from Ohio State University (OSU) together with researchers from the Air Force Office of Scientific Research (AFOSR) Multi-disciplinary University Research Initiative (MURI). One area of this research has focused on the role of alloy substrate microstructural heterogeneity in the formation and breakdown of chromate conversion coatings. Another area of research involves studying the relationship between coating structure and chemistry and coating properties and performance. This relationship will be evaluated under conditions such as less than ideal application methods, conditions that subsequently impair coating corrosion resistance mechanisms, and advanced coating age. Other on-going investigations are focusing on the development of rapid, quantitative, and predictive tests to measure corrosion protection.

Since the project's inception in FY99, a significant amount of valuable research has been completed with potentially far-reaching implications. Highlights of this research include a number of accomplishments summarized here.

- The microstructural and chemical characterization of aluminum armor alloys 2519, 5083, and 7039 has been completed.
- A specially designed small-length scale electrochemical cell has been constructed to support intermetallic compound studies. Two recently completed studies focused on 1) the effect of variable copper concentration on chromate conversion coating formation on 7xxx alloys and 2) the effect of aging on chromate conversion coating properties.
- Researchers also have demonstrated that Raman spectroscopy can be used to monitor epoxy primer curing; examine the state of chromate pigments on primer coats; and examine parts from 30-year-old aircraft.
- Detailed "fingerprints" have been identified that will permit the assessment of structural and chemical changes resulting from weathering. The effects of chromate conversion coating aging at ambient and elevated temperatures also have been studied.

In conjunction with personnel at Brookhaven National Labs, studies examining the kinetics of loss in corrosion resistance were conducted. An Electrochemical Impedance Spectroscopy-based method is currently under development as a rapid predictive accelerated test for chromate coatings. Initial results from this test suggest that the ratio of solution volume to surface area can be manipulated to sense "self-healing" effects in chromate conversion coatings. Follow-on tests have verified these initial findings.

In addition to these accomplishments, Dr. Buchheit's research also may help other SERDP and ESTCP chromate reduction programs through the sharing of results. Currently, there are three SERDP projects and seven ESTCP projects focusing on chromate reduction. The Hard Chrome Alternative Team (HCAT), an American/Canadian research team focusing on aircraft chrome replacement, also will benefit from Dr. Buchheit's research. In short, Dr. Buchheit's demonstrated research success may have a profound effect on the wider field of chromate reduction.

For further information, please contact Dr. Rudolph Buchheit, Department of Materials Science and Engineering, Ohio State University, Columbus, OH, at (614) 292-6085 or via e-mail at buchheit.8@osu.edu. ◆

TECHNOLOGY TRANSFER

SERDP/ESTCP Kudos to....

Mr. John Andrews—Space and Naval Warfare System Center (SPAWAR), San Diego, ESTCP Principal Investigator, for being selected as one of 25 people to receive a 2000 Federal Laboratory Consortium (FLC) Award for Excellence in Technology Transfer. Mr. Andrews and his team received this award for successfully transferring their automated oil spill-sensing technology to a commercial concern, Applied Microsystems, Ltd, in Sidney, BC, Canada. Applied Microsystems has licensed the team's patent, manufactures oil spill detection systems based on this technology, and currently is marketing a commercial version of the Navy sensor internationally. The licensed product, named *Spill Sentry*, has the potential to reduce significantly the amount of oil that enters aquatic environments via releases from pipeline leaks, tank overflows, and illegal dumping. It also will provide immediate notification of accidental spills and will serve to minimize the resulting adverse economic and environmental impact of accidental spills.

Funded under ESTCP project *Oil Spill System Demonstration/Validation*, the technology commercialized is a detection system consisting of a multispectral underwater fluorometer, wireless data communication system, and software that allows for real-time telephone alarming and web-based data access. The development of such an automated oil spill sensing technology assists responders by providing early notification of the presence of a petroleum spill in water. The fluorescence-based sensor operates just below the water surface and continuously tests for an increased hydrocarbon concentration which is indicative of a spill. When a spill is detected, a radio signal is transmitted immediately to a base station computer for analysis, display, and electronic alarming. Once a spill is detected, responders receive an automated phone call alerting them to the event and enabling them to take immediate action.

The FLC is the nationwide network of federal laboratories that provides the forum to develop strategies and opportunities for linking the laboratory mission technologies and expertise with the marketplace.

Patrick J. Evans, Ph.D.—Camp Dresser & McKee Inc. (CDM), ESTCP Principal Investigator, for receiving the Grand Award (Research & Development) from the American Academy of Environmental Engineers (AAEE) for the development of the ESTCP funded Bioremediation Test Kit. Dr. Evans and his team conducted this research with the Naval Facilities Engineering Services Center (NFESC) and ESTCP support under the ESTCP project *Field Demonstration and Validation of Novel Natural Attenuation Analytical Technologies*.

The application of natural attenuation—cost-effective remediation that occurs without human interference—is based on extensive evaluation, modeling, and monitoring. Until now, cost-effective and portable analytical technologies to support its effectiveness did not exist. CDM has developed and field-tested a natural attenuation test kit that includes two analytical technologies, a self-contained dissolved hydrogen (DH) analyzer and a bioavailable ferric iron (Fe III) assay, to monitor two critical attenuation factors effectively and efficiently.

Requiring minimal user training and powered by a 12-VDC automobile power outlet, the DH analyzer is the first field-portable alternative to the lab-based, time-consuming bubble-strip/reduction gas analyzer method. Using an innovative semiconductor chemical sensor to detect hydrogen and a series of built-in catalysts and adsorbents to remove interfering compounds, the analyzer automatically quantifies groundwater DH—an important indicator of the specific anaerobic microbial process responsible for contaminant plume biodegradation.

The Fe III bioassay is the first standardized, systematic method to quantify bioavailable Fe III, iron essential to processes mediated by iron-reducing bacteria to degrade organic contaminants. Bioassay data will promote a keener understanding of the subsurface environment, helping optimize site cleanup through natural attenuation and other remediation technologies.

Data from both analytical technologies can be used during site characterization and regulatory negotiations to validate natural attenuation's cleanup effectiveness, potentially saving millions of dollars over active remediation efforts and further promoting natural attenuation as a viable treatment option. The technologies also offer researchers additional tools to develop a keener understanding of the environment, biodegradation and biotransformation, and new site cleanup technologies.

This award was presented as part of AAEE's annual Excellence in Environmental Engineering Awards competition. ◆

PROGRAM NOTES

S◆E◆R◆D◆P

- **A SUPPLEMENTAL SOLICITATION HAS BEEN RELEASED** requesting proposals in all four Thrust Areas. Preproposals are due September 27. For instructions and Statements of Need, see the SERDP home page www.serdp.org.

E◆S◆T◆C◆P

- **NEW PUBLICATIONS NOW AVAILABLE ON THE ESTCP HOME PAGE www.estcp.org**

Cost and Performance Reports:

Cleanup

Electromagnetic Surveys for 3-D Imaging of Subsurface Contaminants

E◆S◆T◆C◆P *(Continued)*

Cleanup *(Continued)*

Explosives Detecting Immunosensors

UXO

Electromagnetic Induction and Magnetic Sensor Fusion for Enhanced UXO Target Classification

Compliance

A Continuous Emissions Monitor for Hazardous Air Pollutant Metals

UXO FORUM, from page 1

promising technologies rapidly through more realistic evaluations and, ultimately, to an actual cleanup operation at sites such as Kaho'olawe.

During the recently concluded first stage of this project, team's from NAEVA, the Naval Research Laboratory, and Geophex demonstrated their detection and discrimination capabilities at three newly-seeded sites at JPG that contain suitable ranges of munitions and realistic clutter items representative of those found in Kaho'olawe. During the fall of 2000, demonstrators were required to survey the three 1-hectare sites to detect, locate, and discriminate the buried UXO. Survey and analysis time were monitored to obtain accurate production rate and cost information. Demonstrator deliverables to the government were raw and processed data; prioritized dig sheets with confidence levels; and estimates of object size, location, and ordnance type.

The results from the first stage are very exciting. These man-portable systems' UXO detection/discrimination abilities showed significant improvement over the standard "mag & flag" systems. Detection rates over 90 percent were achieved as compared to approximately 65 percent for "mag & flag" with a large reduction in false alarms. These significant improvements in detection and discrimination were achieved at survey costs no greater than a traditional "mag & flag." All three of the UXO survey teams were invited to continue and participate in the second stage to be conducted in the fall of 2001 at prepared test sites in Kaho'olawe.

For more information please contact Mr. Hien Dinh, NAVEODTECHDIV, Indian Head, MD, at (301) 744-6850, ext. 267 or via e-mail at dinh@eodpoe2.navsea.navy.mil or Dr. Ernesto Cespedes, U.S. Army COE-ERDC, Vicksburg, MS, at (601) 634-2655 or via e-mail at Ernesto.R.Cespedes@erdc.usace.army.mil. ◆

PARTNERS IN ENVIRONMENTAL TECHNOLOGY

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

INFORMATION BULLETIN

SUMMER 2001 NUMBER 9

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DSN 426-2117

The Partners in Environmental Technology Information Bulletin is written and published quarterly by HydroGeoLogic, Inc., under contract DACA39-99-C-0002. All written information contained in the Information Bulletin is public and not copyrighted.

Information and ideas for future articles are always welcome. Address comments, suggestions, mailing list requests, and address changes to

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C◆A◆L◆E◆N◆D◆A◆R

FOR SERDP AND ESTCP

AUGUST 2001

August 8-9
SERDP Scientific Advisory Board (SAB) meeting

August 14
ESTCP Compliance Phase II
Review Committee meetings

August 15-16
ESTCP Pollution Prevention Phase II
Review Committee meetings

August 20-22
ESTCP Cleanup Phase II
Review Committee meetings

August 23-24
ESTCP UXO Phase II Review Committee meetings

August 24
Poster presentation abstracts due for SERDP and ESTCP *Partners in Environmental Technology Technical Symposium & Workshop*

SEPTEMBER 2001

September 6
SERDP Executive Working Group (EWG) meeting

September 11-13
SERDP Scientific Advisory Board (SAB) meeting

September 18-19
Compliance In-Progress Review (IPR) meeting for New Start projects

September 20-21
UXO In-Progress Review (IPR) meeting for New Start projects

September 24-25
Pollution Prevention In-Progress Review (IPR) meeting for New Start projects

September 26
SERDP Council meeting

September 27
Conservation In-Progress Review (IPR) meeting for New Start projects

OCTOBER-NOVEMBER 2001

October 1-4
Cleanup In-Progress Review (IPR) meeting for New Start projects

October 15
SERDP quarterly progress reports due for the fourth quarter of Government FY 2001

October 15
ESTCP quarterly reports due for the fourth quarter of Government FY 2001

October 17-18
SERDP Scientific Advisory Board (SAB) meeting

November 27-29
SERDP and ESTCP P*artners in Environmental Technology Technical Symposium & Workshop*

RELATED CONFERENCES & EVENTS

August 5-10
Ecological Society of America (ESA) 2001
Annual Meeting
Madison, Wisconsin

For additional information, visit esa.sdsc.edu/madison.

August 20-23
6th Annual Joint Services Pollution Prevention & Hazardous Waste Management Conference & Exhibition
Henry B. Gonzales Convention Center
San Antonio, Texas

For additional information, visit www.p2-hwmconference.com.

September 5-6
Wetlands & Remediation Second International Conference
Sheraton Hotel & Conference Center
Burlington, Vermont

Co-sponsored by SERDP and ESTCP.

For additional information, visit www.battelle.org/wetlandscon/default.htm.

October 22-25
17th Annual International Conference on Contaminated Soils, Sediments, and Water
University of Massachusetts at Amherst
Amherst, MA

Co-sponsored by SERDP and ESTCP.

For additional information, visit www.UMassSoils.com.

November 11-15
Society of Environmental Toxicology and Chemistry (SETAC)
22nd Annual Meeting
Baltimore Convention Center
Baltimore, Maryland

For additional information, visit www.setac.org/balt.html.

NFORMATION

B◆U◆L◆E◆T◆I◆N

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