



WINTER 2002  
NUMBER 11

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At the recent Partners in Environmental Technology Technical Symposium & Workshop, Deputy Under Secretary of Defense for Installations and Environment Mr. Raymond DuBois challenges the R&D community to meet the needs of defense environmental issues.

For event highlights,  
see center spread of  
this issue.

## Recent Technical Symposium & Workshop Draws Record Crowd

More than 650 environmental professionals converged on the Marriott Wardman Park Hotel in Washington, D.C., November 27-29 making the 2001 *Partners in Environmental Technology Technical Symposium & Workshop* the largest to be hosted by SERDP and ESTCP to date. Under the theme “Building on Past Successes to Address Emerging Issues,” the technical exposition facilitated technology transfer by highlighting world-class research and demonstrations being conducted on persistent environmental challenges and providing unparalleled networking opportunities for participants.

The three-day event opened with a Plenary Session featuring distinguished speakers from the Bush Administration and Congressional Staff who offered key insights into current environmental issues. After opening remarks by Mr. Bradley Smith, SERDP Executive Director, Ms. Madelyn R. Creedon, Counsel for the Senate Armed Services Committee (SASC), provided a historical perspective of SERDP’s origins. Ms. Creedon served as a Principal Committee Staffer for the SASC, working hand in hand with the spearhead for SERDP legislation, Senator Sam Nunn.

From a current perspective, Mr. Raymond F. DuBois, Jr., the newly appointed Deputy Under Secretary of Defense for Installations and Environment, affirmed his commitment to solving the most pressing environmental issues facing the Department of Defense (DoD). He challenged the environmental R&D community to focus on those technologies with the highest payback and was confident that SERDP, ESTCP, and other environmental partnering programs would rise to the occasion.

Dr. Robert E. Foster, Director of the Biosciences Directorate within the Office of the Director, Defense Research and Engineering, responded to the challenge posed by Mr. DuBois. He cited specific examples of

technologies that have been developed by Defense environmental programs and categorized these efforts as those responding to the following: Legacy of Wastes created by Defense operations, Greening the Force, Greening the Defense Industrial Complex, and Stewardship of our Natural Resources.

For the third year, SERDP Principal Investigators who excelled in helping the DoD achieve its mission while improving environmental performance were recognized. SERDP and ESTCP were honored to have Dr. James F. Decker, the Department of Energy’s Acting Director of the Office of Science, present the Annual Project of the Year Awards. Recipients of this prestigious award and a description of their award-winning research follow.

**Cleanup.** The Project of the Year Award for Cleanup technology was actually a joint, multi-project award that went to Dr. John Coates of Southern Illinois University, Dr. Paul Hatzinger of Envirogen, Inc., and Mr. Evan Cox of GeoSyntec Consultants, Inc., for the development of viable in-situ techniques to bioremediate perchlorate. Each of these projects focused on a different developmental aspect of perchlorate remediation — each responsible for a key scientific advancement that collectively resulted in the DoD’s ability to address this significant problem. In recognition of his dedicated efforts to coordinate the mutually beneficial task results and associated data, Mr. Bryan Harre of the Naval Facilities Engineering Service Center, Port Hueneme, CA, was presented a Letter of Commendation.

**Compliance.** Dr. Benny Freeman, North Carolina State University, was selected for his efforts to develop a novel nonporous fouling-resistant composite nanofiltration membrane and membrane systems for shipboard wastewater treatment eliminating the frequent need to recharge and clean the system. Dr. Ingo Pinnau of Membrane Technology and Research, Inc.,

# S • U • C • C • E • S • S S T O R I E S

*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.*

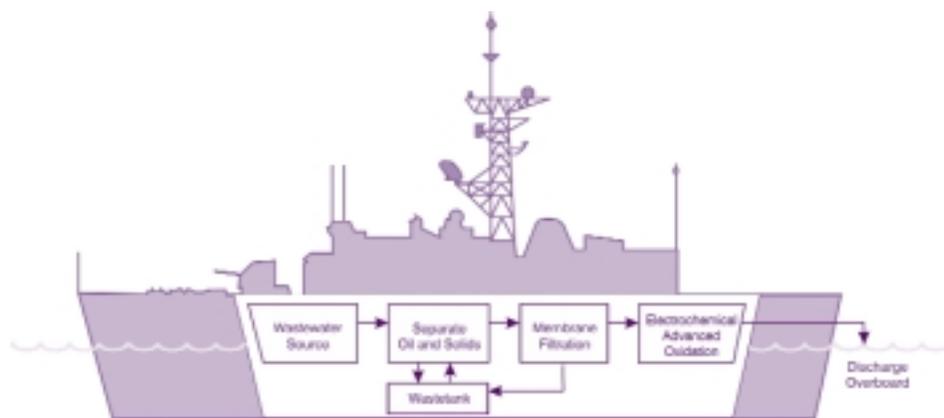


## S U C C E S S S T O R Y

### Compact, Energy-Efficient Water Purification Technology Ready for Field Testing

To comply with International Maritime Organizations Marine Pollution Convention (MARPOL) Annex V and other environmental regulations, U.S. Navy vessels require compact, energy-efficient water purification technology that will allow wastewaters produced on board (bilge, gray, black, etc.) to be discharged overboard following purification. The current practice of using membrane filtration does not achieve the degree of purification required, and a final “polishing” process is needed prior to discharge overboard. Not only is this an issue on Navy vessels, but wastewater created in machine shops at military depots and work centers also must be purified before discharge to sewers.

Through the SERDP-funded project *CP-1107: Electrochemical Advanced Oxidation Process for Shipboard Final Purification of Filtered Black Water, Gray Water, and Bilge Water*, investigators led by Dr. Oleh Weres of Sonoma Research Company have developed an electrochemical Advanced Oxidation Process (AOP). This process will be used as a final polishing step following membrane filtration of shipboard wastewater and is now available and ready for field testing. The process is implemented conveniently as a cluster of compact



**Advanced electrodes allow energy-efficient oxidation of contaminants in Navy ship wastewater**

treatment modules, making it easy to test and tailor to specific applications. The process requires only electric power, an air vent, and electrolytic conductivity equivalent to salty water. The key components of this technology are newly-developed coated titanium electrodes that generate hydroxyl free radicals by electrochemical oxidation of water. Organic substances dissolved in water as well as oxidizable inorganic species are destroyed in a nonspecific manner.

While SERDP supported the technology with treatment of shipboard wastewater in mind, the technology also has numerous other Defense and industrial applications in which high contaminant levels (e.g., 500 to 5,000 of ppm chemical oxygen demand or COD) make conventional AOPs (e.g., UV/peroxide, photocatalysis, Fenton's reaction) uneconomical. The electrodes developed under this SERDP project readily destroy cyanide, phenolics, chemical agent

simulants, and water miscible solvents, and COD is removed with high-energy efficiency. In addition, researchers demonstrated the rapid destruction of p-Nitrophenol, suggesting the technology would work on waste water generated during munitions production as well. These new electrodes have an extended service life and improved performance compared to existing electrodes. Improvements in the electrode coating process allow reprocessing of spent electrodes at a fraction of the cost of replacement.

Two electrochemical AOP units are now available. The larger Model 3.1 unit is suitable for treatability testing and process evaluation in the field. A cluster of several Model 3.1 units can serve an application of small to medium size.

*For more information about this technology, please contact Dr. Oleh Weres, Sonoma Research Company, Napa, CA, at (707) 252-4620 or via e-mail at [sonomarc@napanet.net](mailto:sonomarc@napanet.net).* ♦



## S U C C E S S S T O R Y

### Fuel Additive Remediation Performance Results Yield National Award

ESTCP-funded researchers recently were selected as recipients of the prestigious 2001 Outstanding Ground Water Remediation Project Award from the National Ground Water Association (NGWA) for their work involving in-situ bioremediation of methyl tertiary butyl ether (MTBE). The award for which this research team was selected is given to recognize outstanding engineering or an innovation in the area of remediating groundwater. It is one of 15 different awards that the NGWA can present each year at its annual Ground Water Expo held in December.

The research team's efforts focused on DoD sites where groundwater is contaminated by accidental gasoline leaks and spills. MTBE is a fuel additive that enhances the octane rating to make the fuel burn cleaner, thereby reducing air emissions. The additive currently is present in more than 70 percent of the gasoline distributed in the United States. MTBE is much more soluble and less degradable than other fuel components, and it is highly mobile in the subsurface. To date, it has proven difficult to remediate MTBE-impacted aquifers with conventional treatment technologies.

The researchers from the Naval Facilities Engineering Service Center (NFESC) and Arizona State University are conducting a large-scale MTBE plume containment demonstration at the Port Hueneme Naval Base, Ventura County, CA. This passive flow-through biobarrier system has been designed to degrade MTBE and other dissolved hydrocarbons leaving the down-gradient edge of a residual gasoline-impacted source zone. The biobarrier cultures are comprised of natural bacteria that have been enriched and isolated from an



System layout of the passive flow-through biobarrier system

industrial wastewater treatment plant. Several different combinations of bioaugmentation, air injection, and oxygen biostimulation are being evaluated in this large-scale demonstration, illustrated above.

A unique feature of the demonstration site is the size of the dissolved MTBE plume, which is approximately 500 feet wide and about a mile long. Dissolved MTBE concentrations up gradient of the biobarrier are as high as 10 ppm. Before the system was installed, the MTBE concentrations spanned the width of the biobarrier. In addition to the MTBE, petroleum hydrocarbon compounds also were present in large concentrations in the central core of the plume.

The biobarrier system was installed during the Fall of 2000, and the treatment performance has been exceptional. After seven months, 99.9 percent of the MTBE was removed. The system was equally effective at treating the petroleum hydrocarbon components present in the plume. In summary, groundwater treatment efficiencies in excess of 99.9 percent have been achieved and sustained during the first 12 months of operation, and the MTBE concentrations down gradient of the biobarrier are less than 5 ppb.

There are several other positive implications of this demonstration. The MTBE and other dissolved petroleum hydrocarbons from gasoline are being converted to innocuous carbon dioxide and water. No wastes are being generated, and no water disposal is necessary. Finally, the operation and maintenance costs are low, and the power requirements are minimal.

Prior to the research conducted through *CU-0013: In-Situ Bioremediation of MTBE*, most technologies used have been less effective because they have involved the transfer of MTBE to other parts of the environment, rather than the destruction of MTBE. In addition, it had been projected that remediation costs at MTBE-impacted sites will be 150 to 200 percent greater than at fuel-impacted sites where MTBE is not present. The innovative application of this bioremediation approach to the destruction of MTBE at DoD sites is promising and has an estimated cost savings of at least \$100,000 at each MTBE-impacted fuel-spill site.

*For more information about this project, 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.* ♦

*"Building on Past Successes  
to Address Emerging  
Issues"*



# Partners in Environmental Technology Technical Symposium & Workshop

November 27-29, 2001  
Marriott Wardman Park Hotel  
Washington, D.C.



As part of the Plenary Session, Ms. Madelyn Creedon provides a historical perspective of SERDP's origins.



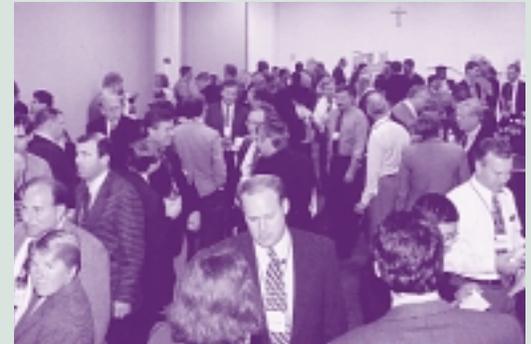
Past Executive Directors, Dr. Robert Oswald (second from right) and Dr. John Harrison (second from left), join Brad Smith (left) and Jeff Marqusee.

PHOTOS BY CRAIG KELLSTROM

# HIGHLIGHTS



Above and right: Dr. Mel Roquemore of AFRL-Wright Patterson AFB receives the SERDP Project of the Year Award for P2.



Stimulating technical sessions and networking opportunities abound at the 2-1/2 day event.



Point/Counterpoint views are provided by a panel during a technical session.

# TECHNICAL SYMPOSIUM AND WORKSHOP

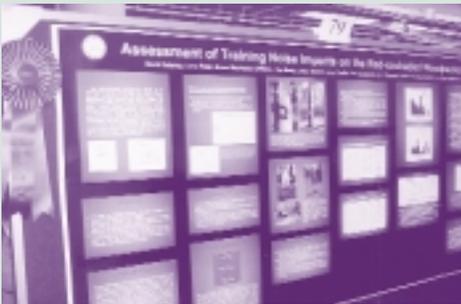
## *"Building on Past Successes to Address Emerging Issues"*



Left to right: Dr. James Decker, DOE Office of Science, presents the Cleanup Project of the Year Award to Dr. John Coates, Dr. Paul Hatzinger, and Mr. Evan Cox.



Dr. Larry Pater (second from left) displays his Conservation Project of the Year Award with his ERDC/CERL teammates.



Projects of the Year contribute to a banner poster session.



Mr. Bryan Harre receives his Letter of Commendation for coordinating three effective perchlorate remediation projects.



Members of the ITRC present an award to Mr. John Paul Woodley, Assistant Deputy Under Secretary of Defense for Environment.



Dr. Benny Freeman (right) accepts his Compliance Project of the Year Award from Dr. Decker.



Ms. Madelyn Creedon, Counsel for the Senate Armed Services Committee, and Dr. Robert Oswald, former SERDP Executive Director, were among the distinguished guests at the Symposium and Workshop.



Dr. Robert Foster provides a response to the technical challenges posed by Mr. DuBois.



From right: Dr. Marqusee, Mr. DuBois, and Mr. Woodley listen intently to recent technology advances.

# Program Development Update

## SERDP

In preparation for a March 2002 Scientific Advisory Board review, SERDP has completed the independent peer review cycle for the 104 proposals competing for FY 2002 supplemental funding. Technically qualified proposals have been forwarded to the multi-agency Technology Thrust Area Working Groups, or TTAWGs, to evaluate proposals against all five evaluation criteria. Those recommended for funding will be sent to the SERDP Executive Director for integration into the Core FY 2002 Program that already had been approved by the SERDP Council last September. Of note, Congress did pass the Defense Appropriations Bill but only approved \$10 million of the requested \$20 million increase for SERDP proposed by the President. While incremental funding had been released previously for Continuing projects, funds for FY 2002 New Start projects should be available this month for federally led projects

and in March for projects requiring contract preparation.

Preproposals from the private sector have been received from bidders interested in competing for FY 2003 core funding, and SERDP already has sent correspondence asking the authors of encouraging preproposals to submit full proposals to be received no later than March 7. Similarly, federal sector proposals also are due by this date. Together, these proposals will undergo an independent peer review evaluation during April and then be reviewed by the TTAWGs during the summer.

Researchers also had an opportunity to submit SEED proposals for consideration under FY 2003 funding. These were due February 7. SEED proposals are designed for high risk, proof of principle efforts and require no more than \$100 thousand and take no longer than one year.

For further details on the requirements and schedule for any of the solicitations listed above, please

refer to the SERDP web site [www.serdp.org](http://www.serdp.org).

## ESTCP

In early January, a Call for ESTCP Proposals was sent to DoD organizations soliciting demonstration proposals in Cleanup, UXO, Compliance, and Pollution Prevention technology Pillars. These proposals are due the 11th of April and will be reviewed by a DoD Review Committee in the late June timeframe.

Similarly, a Call for Proposals to other non-DoD federal organizations and a Broad Agency Announcement for private sector bidders has been released requesting preproposals in the UXO and Cleanup Pillars. All preproposals are due at the SERDP/ESTCP Program Office no later than March 14. Based upon a relevancy review, qualified proposers will be asked to submit full proposals for review later in the summer.

For additional details on all ESTCP solicitations, please refer to the ESTCP web site [www.estcp.org](http://www.estcp.org). ♦

## RECORD ATTENDANCE, from page 1

also was recognized for his significant contributions to this effort.

**Conservation.** Conservation's Project of the Year was awarded to Dr. Larry Pater, assisted by Mr. David Delaney, from the Army Corps of Engineers Engineer Research and Development Center's Construction Engineering Research Laboratory (CERL) in Champaign, IL. Dr. Pater and his colleagues collaborated to determine the impacts of training noise on the Red-Cockaded Woodpecker. Specifically, they conducted their research on the impacts of military operations on individual behavior, reproductive success, and species population survival and discovered that these operations had minimal to no effect.

**Pollution Prevention.** The final award was presented to Dr. Mel Roquemore of the Air Force Research Laboratory at Wright Patterson Air Force Base who has developed a prototype trapped

vortex combustor (TVC) for turbine engines that effectively reduces Nitrogen Oxide (NOx) by 50 percent and Volatile Organic Compounds (VOC) by 60 percent and also provides significant operational enhancements. Dr. Roquemore's TVC is being transitioned to the Naval Air Systems Command that currently heads a Joint Government Industry ESTCP team to design and test an engine quality TVC for the GE F414 engine used in the Navy F-18E/F fighter. It also has been placed on the fast track for introduction into DoD's Integrate High Performance Turbine Engine Technology Program.

Following the Plenary Session, a two-and-one-half day comprehensive technical workshop provided 12 technical sessions, each of which focused on a pivotal aspect of the Defense environmental effort. Topics and abstracts can be found on the SERDP web site under the *Symposiums & Workshops* button (Past Events) and on

the ESTCP web site under the *Related Events* button (Past Events).

In between technical sessions and during lunch and the evening receptions, participants enjoyed several valuable opportunities to interact with the technical presenters and other attendees as well as with the more than 150 poster presenters (an increase of approximately 40 percent over last year) and 24 exhibitors from various departments and agencies. Always billed as one of the most beneficial aspects of the Symposium, the daily networking sessions will be expanded even further next year in response to feedback from attendees.

Plans are already well under way for the next Symposium & Workshop. Be sure to mark your calendars for December 3-5, 2002. The event once again will be held at the Marriott Wardman Park Hotel in Washington, D.C. Watch our web sites for additional details. ♦

- ◆ **THANKS TO ALL WHO PARTICIPATED IN THE PARTNERS IN ENVIRONMENTAL TECHNOLOGY TECHNICAL SYMPOSIUM & WORKSHOP IN NOVEMBER.** The event marked the largest yet and was a tremendous success thanks to all of your efforts. Be sure to mark your calendar for the next Symposium & Workshop which is scheduled for December 3-5, 2002, at the Marriott Wardman Park Hotel, Washington, D.C.
- ◆ **AT THE RECENT SYMPOSIUM & WORKSHOP, THE INTERSTATE TECHNOLOGY AND REGULATORY COOPERATION (ITRC) PRESENTED AWARDS TO SENIOR DOD OFFICIALS** expressing appreciation for DoD support for the ITRC program. Bob Shinn, Commissioner of the New Jersey Department of Environmental Protection, and John Paul Woodley, Assistant Deputy Under Secretary of Defense for Environment, as well as the Deputy Assistant Secretaries of the Services and others received awards. For additional information on the ITRC award presentation, visit <http://www.itrcweb.org/awardsnov01r2.pdf>.
- ◆ **BEGIN PLANNING NOW FOR THE COMBINED SERDP AND ESTCP IN-PROGRESS REVIEWS (IPR)** which are scheduled to be held in the Washington, D.C., area during April and May. The current schedule calls for the IPRs to be held on the following dates: Compliance IPR (April 9-11); Conservation IPR (April 17-19); Pollution Prevention IPR (April 22-26); Cleanup IPR (April 29-May 3 and May 13-16); and UXO IPR (May 7-9).
- ◆ **THE FINAL REPORT FROM THE CHLORINATED SOLVENT SITE CLEANUP WORKSHOP HELD IN AUGUST 2001** will soon be posted on both the SERDP and ESTCP web sites. The Final Report outlines technology focus areas for the clean up of chlorinated solvents and SERDP and ESTCP's potential approach to address DoD sites contaminated with chlorinated solvents.

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- ◆ **THE SERDP SCIENTIFIC ADVISORY BOARD (SAB) IS SCHEDULED TO MEET MARCH 5-7** in Arlington, Virginia. New Start projects from the FY 2002 Supplemental Solicitation will be reviewed. Contact Amy Kelly at (703) 696-2124 or via e-mail at [Amy.Kelly@osd.mil](mailto:Amy.Kelly@osd.mil) for additional information.
- ◆ **FULL PROPOSALS REQUESTED IN RESPONSE TO THE BROAD AGENCY ANNOUNCEMENT (BAA) AND THE FEDERAL CALL FOR PROPOSALS ARE DUE** to the Program Office by 4:00 p.m. EST on March 7.
- ◆ **QUARTERLY PROGRESS REPORTS** (i.e., the quarter's technical accomplishments, updated completion dates for milestones, and any concerns regarding technical/financial progress using SPIRS) for the second quarter of Government FY 2002 is due by April 15, 2002. For assistance, contact your Program Manager Assistant.

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- ◆ **PREPROPOSALS IN RESPONSE TO THE NON-DOD FEDERAL AND BAA SOLICITATIONS ARE DUE** to the ESTCP Program Office by 4:00 p.m. EST on March 14.
  - ◆ **DOD PHASE I PROPOSALS ARE DUE** to the ESTCP Program Office by 4:00 p.m. EST on April 11, 2002.
  - ◆ **QUARTERLY REPORTS FOR THE SECOND QUARTER OF GOVERNMENT FY 2002 ARE DUE APRIL 15, 2002.** For assistance, please contact your Program Manager.
  - ◆ **NEW PUBLICATIONS NOW AVAILABLE ON THE ESTCP HOME PAGE** [www.estcp.org](http://www.estcp.org)
- Cost and Performance Reports:**
- Cleanup**  
 Use of Cometabolic Air Sparging to Remediate Chloroethene-Contaminated Groundwater Aquifers
  - Compliance**  
 Measurement of Lead in Drinking Water
  - Recovery and Reuse of HMX/RDX from Propellants and Explosives (150 lbs/day Pilot Plant)



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

**INFORMATION**  
**B ♦ U ♦ L ♦ L ♦ E ♦ T ♦ I ♦ N**

WINTER 2002 NUMBER 11

<b>SERDP Executive Director</b>	<b>Bradley Smith</b>
<b>ESTCP Director and SERDP Technical Director</b>	<b>Dr. Jeffrey Marquese</b>
<b>Program Manager for UXO</b>	<b>Dr. Anne Andrews</b>
<b>Program Manager for Compliance and Conservation</b>	<b>Dr. Robert Holst</b>
<b>Program Manager for Cleanup</b>	<b>Dr. Andrea Leeson</b>
<b>Program Manager for Pollution Prevention</b>	<b>Charles Pellerin</b>
<b>Administrative Officer</b>	<b>Brenda Batch</b>
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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

## F O R S E R D P A N D E S T C P

### MARCH 2002

#### March 5-7

SERDP Scientific Advisory Board (SAB) meeting, Arlington, Virginia

#### March 7

SERDP full proposals due in response to the Broad Agency Announcement (BAA) and federal Call for Proposals

#### March 14

ESTCP preproposals due in response to the non-DoD federal and BAA solicitations

### APRIL 2002

#### April 11

ESTCP DoD Phase I proposals due

#### April 9-11

Compliance In-Progress Review (IPR) meeting

#### April 15

SERDP quarterly progress reports due for the second quarter of Government FY 2002

#### April 15

ESTCP quarterly reports due for the second quarter of Government FY 2002

#### April 17-19

Conservation In-Progress Review (IPR) meeting

#### April 22-26

Pollution Prevention In-Progress Review (IPR) meeting

#### April 29-May 3

Cleanup In-Progress Review (IPR) meeting

### MAY 2002

#### May 7-9

UXO In-Progress Review (IPR) meeting

#### May 13-16

Cleanup In-Progress Review (IPR) meeting

### RELATED CONFERENCES & EVENTS

#### April 1-5

AeroSense 2002—16th Annual International Symposium on Aerospace/Defense Sensing, Simulation, and Controls  
Gaylord Palms Resort & Convention Center (formerly Opryland Hotel)  
Orlando, FL  
Sponsored by SPIE—The International Society for Optical Engineering.

For more information, visit <http://spie.org/info/or>.

#### April 2-5

National Military Fish & Wildlife Association  
67th North American Wildlife and Natural Resource Conference  
Hyatt Regency Dallas at Reunion  
Dallas, TX

For more information, visit [http://www.nmfwa.org/2002\\_Meeting/index.htm](http://www.nmfwa.org/2002_Meeting/index.htm).

#### April 23-27

17th Annual Symposium: International Association for Landscape Ecology—United States Regional Association  
Cornhusker Hotel and Burnham Yates Conference Center  
Lincoln, NE

For more information, visit [www.calmit.unl.edu/usiale2002](http://www.calmit.unl.edu/usiale2002).

#### May 20-23

Remediation of Chlorinated & Recalcitrant Compounds: The Third International Conference  
Doubletree & Marriott Hotels/Monterey Conference Center Complex  
Monterey, CA  
Sponsored by Battelle.

For more information, visit [www.battelle.org/chlorcon](http://www.battelle.org/chlorcon).

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