CRESP

CRESP Update
Savannah River

Volume 4 ■ Number 3 ■ November 1999

Task Group Reports

■ ■ ■ ■

CRESP Headquarters
Plaza II ■ 317 George Street
New Brunswick, New Jersey 08901
Voice 732-235-9603 ■ Fax 732-235-9607
Charles W. Powers, Ph.D. ■ Executive Director

CRESP-EOHSI
Environmental and Occupational Health Sciences Institute
170 Frelinghuysen Road
Piscataway, New Jersey 08855-1179
Voice 732-445-0520 ■ Fax 732-445-0959

CRESP-UW
University of Washington
Department of Environmental Health
PO Box 354695
Seattle, Washington 98195
Voice 206-616-4874 ■ Fax 206-616-4875

Evaluating Cleanup Technology

SRS is a leader in the Department of Energy complex effort to develop new methods and technologies to cleanup contaminated sites. With this aggressive approach to meeting remediation goals, many questions need to be answered to evaluate these new methods' usefulness. When is the goal to cleanup a site reached? How low a concentration of a contaminant level can be achieved through a specific method? How much will it cost to make it work? What is the most cost effective use of new technologies?

The Remediation Technology and Exposure Assessment Task Group is developing a tool that evaluates technologies and the realistic endpoints for cleanup through examining new technologies cleaning up the C-Area Burning Rubble Pit Tricholorethylene (TCE) plume. DOE, Westinghouse, South Carolina Department of Health and Environmental Control and the Environmental Protection Agency are contributing actual data from the C Area to use in developing and refining the tool.

Two different remediation techniques are used in concert: a soil vapor extraction that draws out the trichloroethylene (TCE) from the vadose, or unsaturated zone, and air sparging, a method that pumps air into groundwater and causes TCE to transform to a gaseous state. The gas then is extracted with the first method. (See *CRESP Update*, Jan. 1999 for more details).

To answer questions about the effectiveness of these methods, qualities of TCE and other contaminants in the C Area Rubble Pit first need to be understood. For example, if some TCE is removed from one layer of the subsurface, how will it spread out through the remaining area? Research that focuses on understanding how TCE moves through the groundwater and vadose zone is conducted at CRESP by examining SRS water samples, soil vapor samples, soil cores and remedial system performance. TCE and other contaminants were found to move through the subsurface at different speeds and densities. This helps to understand what happens when the technologies are used or turned off and what happens to the TCE left in the subsurface.

This laboratory science, combined with theoretical research, is working to optimize an onsite cleanup process, to define what the endpoint should be with the technology, and how to make the operation more cost effective. Dave Kosson, Remediation Technology Task Group Leader says, "The development of this tool leads to more efficient remediation in defining what the limits of the technology are

CRESP Task Group Leaders at EOHSI

Data Characterization, Analysis, and Statistics
Dan Wartenberg, Ph.D.

Ecological Health
Joanna Burger, Ph.D.

Exposure Assessment
Paul Lioy, Ph.D.

Health Hazard Identification
Lynn Fahey McGrath, Ph.D.

Outreach and Communication
Lynn Waishwell, Ph.D.

Remediation Technology
David Kosson, Ph.D.

Social, Land Use, Demographic, Geographic, and Economic
Michael Greenberg, Ph.D.

Worker Safety and Health
Michael Gochfeld, M.D., Ph.D.

■ ■ ■ ■

If you . . .

. . . want to get *CRESP Update: Savannah River* regularly, send your name, mailing address, city, state, and zip code plus area code and daytime telephone number to —

CRESP Update: Savannah River
EOHSI-PERC Room 236
170 Frelinghuysen Road
Piscataway, NJ 08855-1179

. . . would like information about CRESP or any of its activities, contact —

Lynn Waishwell
Director of Outreach and
Communication Task Group
Voice 732-445-0920
Email lwaishwe@eohsi.rutgers.edu

. . . want to read about CRESP on the web or access previous issues of this newsletter, our URL is —

www.cresp.org

so people are not wasting time to meet unachievable goals. This tool can help to define what achievable goals are and how to reach them in a cost effecient way." For more information contact Dave Kosson at kosson@rci.rutgers.edu or at 732-445-4346.

Ecological Health

This Task Group is proceeding with projects reflecting three central ideas: 1) understanding attitudes and perceptions about ecological resources, 2) identifying bioindicators and biomarkers, and 3) refining restoration and stewardship. The overall objective is to develop risk methodologies that can be used complex-wide to understand how ecological resources and their use by stakeholders are impacted by DOE activities, including remediation and restoration.

The Department of Energy (DOE) is faced with a monumental environmental remediation and restoration task that will take decades and cost over 300 billion dollars. Ecological Task Group studies concluded that there is a need for a comprehensive environmental monitoring plan that can be used both to aid in making remediation decisions, as well as to evaluate remediation and restoration efforts. The Task Group has examined many different species and species groups as possible indicators of ecological stress, ecological damage, and potential recovery. An initial objective was to develop overall ecological risk methods which would contribute to the long term cleanup, remediation, and restoration of DOE sites.

The current operable unit approach of the DOE manages and remediates small hazardous waste sites without taking into account the vastness of the large DOE sites. This piece-meal approach rarely allows for an evaluation of the broader environmental problems or of the value of existing ecosystems established on the buffer lands around the restricted industrial sites. An overall biological monitoring plan that includes all levels of ecological organization, from single species indicators to ecosystem measures should be created. This monitoring plan should include bioindicators that can be used for both human and non-human receptors. A sound biomonitoring plan should provide information on all levels of ecological organization, including individuals species, populations and communities, ecosystems, and landscapes. For biomonitoring to be effective, it must be relevant biologically, methodologically, and societally. Key elements in the plan must include indicators of all ecological levels that meet these criteria.

CRESP's Ecological Task Group work at Savannah River developed indicators at each of the four levels of biological organization: ducks, mourning doves and raccoons at the individual species and population level, amphibian and fish assemblages at the community level, comparisons at the community and ecosystem level, and habitat suitability indices at the landscape level. We have been developing Indices of Biotic Integrity for fish and amphibians (Savannah River), and for plants and insects (Hanford), to provide an indication of physical, chemical, and radiological stresses to communities and ecosystems.

Such a plan is by its very nature a work in progress. It is also a collaborative process between many different groups within CRESP, as well as Savannah River Ecology Lab and others. Such an complete biomonitoring scheme can be used to assess current damage from past

actions and inaction, to predict future damage from management or remediation action, and to assess whether remediation or restoration actions have been successful. This scope of the biomonitoring plan is essential for wise stewardship of the DOE sites.

Information on progress in any of our projects can be found by consulting the last several newsletters, or by contacting J. Burger at **burger@biology.rutgers.edu** or at 732-445-4318.

Social, Land Use, Demographic, Geographic and Economic (SLUDGE)

Recently Karen Lowrie of the SLUDGE Task Group interviewed local land use planners from communities near twelve DOE sites, including SRS, to learn about their experiences and concerns for long-term planning and stewardship. As the DOE moves from cleanup to reuse and eventual closure at some of its major sites, planning how the land will be used becomes increasingly important. Effective coordination with town and regional planners will be an essential part of this process.

Twenty-one planners from counties hosting a DOE site or adjacent counties and towns were interviewed to learn of their experiences with on-site personnel and to solicit suggestions for future efforts. Interviews with personnel at DOE sites and a review of planning documents prepared by the site were also conducted. These activities revealed that required land use planning for DOE sites is not done consistently across sites. This results, in part, from the many initiatives have occurred over the years.

Site planners were asked for opinions about the major land use issues facing neighboring communities. Economic impacts of the sites on nearby communities and the identification of residential or industrial use of site land were two concerns. The need to resolve the final states of the sites, and to assure that public health would not be affected to in the future were also cited by many site planners. Stewardship, or long-term protection of health and the environment, is an increasingly important DOE and public concern. Site planners interviewed expressed differing ideas about stewardship and the Department's roles for stewardship planning.

Offsite planners felt there was little communication with onsite personnel. Much distrust of site efforts still exists, and many local and regional planners felt that local DOE personnel had no interest in engaging them in future planning. Improving dialogue and coordination between local municipalities and onsite planners is a major recommendation of this project. As cleanup and land reuse decisions will occur more often as DOE sites are closed, this communication is essential. Other recommendations for improving site land use planning and coordination with offsite local planners are reported. For more information contact Karen Lowrie at klowrie@rci.rutgers.edu or 732-932-0387 x577.

At the request of SRS officials, SLUDGE is also beginning a project to evaluate the economic impacts of the suggested alternatives for resuming the High Level Waste In-Tank Precipitation (ITP) Process. Working with data provided by SRS, the Task Group will analyze the regional effect of equipment purchases, construction, personnel and other costs of each of the suggested alternatives. This will aid decision makers in selecting the preferred approach.

Outreach and Communication

Lynn Waishwell, Outreach and Communication Task Group Leader, is working with Joanna Burger, Task Group Leader of the Ecological Health Group at EOHSI, to conduct a preliminary study that examines effectiveness of the Fish Fact Sheet handout developed by DHEC, USEPA, and GDNR. CRESP studied eating patterns of people who fish along the Savannah River. This work helped facilitate the creation of a specific fact sheet aimed at educating the people most at risk from eating Savannah River fish. The Fish Fact Sheet highlights potential risks and suggests ways to reduce the levels of contaminants consumed. In this initial part of the current study, people who are fishing along the river are asked to read the Fish Fact Sheet, comment on the information they learned, and suggest ways to further share the information. A summary of this information will be discussed with the SRS-CAB to further refine the questions that will be asked when the more extensive examination of the Fish Fact Sheet interviews occur this Fall. For more information, contact Lynn Waishwell at **lwaishwe@eohsi.rutgers.edu** or at 732-445-0920

CRESP-University of Washington

CRESP-UW Exposure Assessment Task Group Leader John Kissel and his research team are evaluating exposures of individuals and populations to toxic substances via dermal (skin) contact with contaminated soils, such as those found at Hanford and other Department of Energy sites. These are known as "soil exposure pathways." Research conducted by Dr. Kissel's team has improved knowledge about soil adherence to

and absorption through skin and behavior patterns that might lead to contact with soil.

In the absence of detailed data, U.S. Environmental Protection Agency (EPA) standard soil exposure models apply default assumptions. CRESP research concluded that soil adherence levels from most studied activities fell within the EPA's default range, but some activities (such as children playing in mud) led to significantly over-estimation of exposure. In another study, Dr. Kissel's team surveyed adults near Hanford and nationwide on behaviors that could lead to soil contact, including sports, yard work and home construction or repair. The survey revealed that a large majority of respondents participate in one or more of these activities. Data from a follow-up survey of children's play behaviors are currently being analyzed.

On November 2 and 3 in Richland, Washington, CRESP and several co-sponsors presented the third annual Conference on the Health of the Hanford Site. This was an opportunity to exchange views, present research findings and discuss what should be done relating to ecological, community and occupational health at Hanford. For information, visit the Health of the Site Conference website at <http://depts.washington.edu/cresp2/hos> or call CRESP at (206) 616-7377. CRESP-UW presenations addressed nuclear waste transportation, ecological health issues, and beryllium sensitization.

The Hanford Openness Workshops, coordinated by the CRESP-UW Outreach and Communication Task Group, held a special Tribal Openness Workshop on June 2 and September
A September 7 and 8 meeting focused on reviewing the Workshops' draft 1999 Report. A survey of discussions, outcomes and recommendations, along with positive and negative examples of employee openness, use of information tools, declassification efforts, public involvement and tribal openness at DOE-Richland. For more information, contact CRESP-UW Outreach Director/HOW Facilitator Michael Kern at mkern@u.washington.edu or at (206) 616-3719 .

The **Consortium for Risk Evaluation with Stakeholder Participation** (CRESP) is a university-based national organization created specifically to develop a credible strategy for providing information needed for risk-based cleanup of complex contaminated environments, especially those for which the Department of Energy is responsible. The Consortium specifically responds to the request by the Department of Energy and the National Research Council for the creation of an independent institutional mechanism capable of integrating risk evaluation work. As a result of a national competition, a five-year cooperative agreement was awarded to CRESP in March of 1995. *CRESP Update: Savannah River* is one way to share research plans and programs with Savannah River Site stakeholders.

CRESP Update: Savannah River
EOHSI-PERC Room 236
170 Frelinghuysen Road
Piscataway NJ 08855-1179