



# CRESP UPDATE *Hanford*

A QUARTERLY REVIEW OF THE CONSORTIUM FOR RISK EVALUATION WITH STAKEHOLDER PARTICIPATION'S RESEARCH AND ACTIVITIES RELATING TO THE HANFORD NUCLEAR SITE IN SOUTHEASTERN WASHINGTON STATE. FALL 1999

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## CRESP HOSTS GATHERING TO DISCUSS THE HEALTH OF THE HANFORD SITE

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*CRESP Update: Hanford is published by CRESP-UW's Outreach & Communication Task Group. To provide information or be added to the mailing list, contact Donna Prisbrey, (206) 616-3523, [donnapri@u.washington.edu](mailto:donnapri@u.washington.edu)*

The Third Annual Health of the Hanford Site Conference was held November 2 and 3, 1999 in Richland, Washington. Organized by the University of Washington (UW) and many regional co-sponsors, the conference provided a forum for all people interested in Hanford to share information on the ecological, community and occupational health of the Hanford site.

"Cleanup is a fragile consensus that is unlikely to persist," observed UW historian Dr. Bruce Hevly in his keynote address. Consistent with Dr. Hevly's message, a sense of urgency surrounding the need to make near-term progress on cleanup was common to all of the conference's panels. Highlights included sessions on tank waste treatment and end states for Hanford.

The tank waste treatment session included panelists from the Office of River Protection, the Washington State Department of Ecology and British Nuclear Fuels, Ltd. All parties agreed that the amount of money required to complete the project overshadows its significant technical challenges. At over one billion dollars per year, obtaining sufficient funding from Congress will be extremely difficult.

What will Hanford look like when cleanup is completed? A panel entitled "Evaluating Risk for End States at Hanford" presented work aimed at answering this question. This included papers on a holistic inventory of Hanford's contamination, assessing risks posed by Hanford and using groundwater modeling to better understand risks related to cleanup.

Panels focused on the Hanford Thyroid Disease Study and the Individual Dose Assessment project were not characterized by a "fragile consensus." Panelists often disagreed about the usefulness of these health studies. Government officials held that these studies are the best that can be expected, given incomplete data and the uncertainties of modeling past radiation releases. Downwinder representatives disagreed, believing the studies are flawed.

The conference also included sessions on worker health. "Beryllium: Understanding Risk to Hanford Workers" presented significant work on diagnosing, tracking and understanding beryllium sensitization and Chronic Beryllium Disease in Hanford workers. The results of two studies evaluating the health of Hanford workers were also discussed (see article on page two).

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The panels described above represent only a sampling of the information shared at the conference. Current research on issues including lichens, elk, insects, management systems, epidemiological studies, land use history, nuclear waste transportation and other topics was also presented.

To learn more or to request a copy of the conference proceedings, visit the Health of the Hanford Site web page at <http://depts.washington.edu/cresp2/hos> or call (206) 616-7377.

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## HEALTH PROBLEMS FOUND AMONG FORMER HANFORD WORKERS

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by John Abbotts, PhD

At the recent Health of the Hanford Site Conference (see page one), Dr. Tim Takaro, leader of the CRESP-UW Worker Safety and Health Task Group, reported results from medical monitoring that is evaluating the health of former Hanford workers. Two separate health screening programs—one conducted by the UW for production and non-construction workers and one by the Center to Protect Workers' Rights for building trades workers—have found that many former Hanford workers have significant health problems due to their work at the site.

The Defense Authorization Act of 1993 required the Department of Energy to implement a medical evaluation program for workers at significant health risk due to workplace exposures. During the first year of the projects, UW researchers examined 209 former workers. The Center examined 354 former building trades workers. These are the first independent, science-based evaluations of non-cancer health risks to former Hanford workers.

Investigators caution that the screening does not represent a controlled epidemiological study because workers who believed their health was damaged volunteered for monitoring (rather than a truly random sample). Nonetheless, the results are striking. "Together, we have examined nearly 600 workers so far and we are finding a high degree of pathology," said Dr. Takaro. "These surveys found more work-related diseases among Hanford workers than we had anticipated."

The UW program reached the following findings:

- Chest x-rays showed that nearly half of the workers required follow-up for abnormal findings. The abnormalities identified were often consistent with exposure to asbestos. Nearly one in five former workers demonstrated diminished lung function.

- Seven out of ten workers demonstrated hearing loss to an extent compensable under Washington state law.
- Over five percent of those tested showed positive results for sensitization to beryllium, a metal used at Hanford that can cause chronic lung disease through an immune response. One-third to one-half of the workers identified as sensitized can be expected to develop chronic beryllium lung disease within five years.

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"These surveys found more work-related diseases among Hanford workers than we had anticipated."

- Dr. Tim Takaro, CRESP-UW

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- Forty-five percent of workers monitored required follow-up for skin lesions, high blood pressure, hearing loss or respiratory disease.

The screening program is documenting the condition of former workers and helping them receive medical treatment for their needs. It is also providing information on health risks and exposure histories of former workers to DOE, to facilitate better health protection for current and future workers. Roger Briggs, Hanford Health Studies Coordinator and a certified industrial hygienist with DOE-Richland, was present during the reporting of medical results. He commented, "The findings of this screening program indicate the importance of having an occupational health medical program for current workers capable of evaluating a worker's exposure to hazards on the job."

CRESP is a university-based national organization created to provide information for risk-based clean up of complex contaminated environments. CRESP was formed in response to a request by the Department of Energy and the National Research Council for the creation of an independent institution for integrating risk evaluation work. As a result of a national competition, a five-year cooperative agreement was awarded to CRESP in March, 1995. *CRESP Update: Hanford*, published quarterly, is one method CRESP uses to disseminate its research to interested parties.



by John Abbotts, PhD

Dr. James Karr, Professor of Fisheries and Zoology, heads CRES-P-UW's Ecological Health Task Group. In a recent article in the scientific journal *Freshwater Biology*, Dr. Karr evaluates the connection between scientific research and environmental policy with regard to the health of rivers.

Rivers provide society with many benefits including irrigation, electric power, drinking water, sport and commercial fishing, and recreation. Yet human activity over the past century has threatened river health. Consequently, the US Congress passed the Clean Water Act of 1972 "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." Canadian environmental legislation and the Great Lakes Water Quality Agreement between the US and Canada contain similar core principles.

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"A new model should inform society not only about the conditions of rivers and their landscapes, but also about the lives of people living in those landscapes."

- Dr. James Karr, CRES-P-UW

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The article describes an evolution of models for river protection. At the turn of the century, the goal was to halt the dumping of raw sewage and oil. More recent models have focused on reducing chemical contamination and developing a more comprehensive analysis of watersheds. "A new model should inform society not only about the conditions of rivers and their landscapes, but also about the lives of people living in those landscapes," Dr. Karr argues. "That model should focus on biological endpoints as the most integrative measures of river health."

Dr. Karr calls for the integration of many biological attributes to assess and communicate ecological health. He and his colleagues have conducted research over two decades to develop and refine an

Index of Biological Integrity (IBI) for aquatic systems (rivers and streams). IBIs can assist biologists, managers, regulators and decision makers in formulating environmental strategies and assessing their results. As Dr. Karr concludes, "In the end, a healthy river is a living river."

Criteria for an effective IBI include: 1) the selection of measures that provide reliable signals of river condition and reflect the influence of human activity, 2) sampling procedures that measure such biological signals, and 3) analytical procedures that reveal relevant biological patterns.

However, all these efforts and activities are wasted if the process is not designed to provide easily communicated and interpreted results. Dr. Karr notes, "Effective communication can transform biological monitoring from a scientific exercise into an effective tool for environmental decision making." The real measure of success for IBI is that it has been adopted by citizen groups and agencies at the state and federal level.

The Winter 1999 issue of **CRES-P Update: Hanford** described in more detail the research of Dr. Karr and co-workers at Hanford to adapt an IBI to terrestrial (land-based) systems. The Ecological Health Task Group has gathered data from insects, plants and cryptogams (flowerless and seedless plants) over three years at Hanford and one year at DOE's Idaho National Engineering and Environmental Laboratory.

Because of his expertise in ecological health, Dr. Karr was appointed to the Department of Energy's Expert Panel for the Hanford Groundwater/Vadose Zone/Columbia River Integration Project. The panel was formed to provide recommendations and advice to DOE on ways to reduce contamination of groundwater and the vadose zone at Hanford.

The publication described above is **Defining and measuring river health**, *Freshwater Biology* 41, 221-234, 1999.

by John Abbotts, PhD

This column is intended to provide a look at the people behind CRESP and the range of experience and expertise CRESP brings together. In this issue, we feature investigators from Task Groups whose work is described in this newsletter.

**Dr. James Karr, PhD**, UW Leader of the Ecological Health Task Group, is professor of fisheries and zoology and adjunct professor of civil engineering, environmental health and public affairs. His research has included ornithology, stream ecology, conservation biology, ecological health and environmental policy. Dr. Karr developed the Index of Biological Integrity (IBI) as a biologically based approach to evaluate the quality of water resources. The Ecological Health group is adapting the IBI concept for assessment of terrestrial (land-based) environments at Hanford. Dr. Karr notes, "My primary concern is to improve the use of ecological information in societal decision making to develop environmental remediation actions that are cost-effective and protective of living systems."

**Dr. Mary Salazar, EdD, RN, COHN-S**, is an Associate Professor and Director of the Occupational Health Nursing Program at the UW School of Nursing. Most of her research in recent years has focused on the development and evaluation of occupational health and safety programs. As a member of the Worker Health and Safety Task Group, she has worked on several CRESP projects examining the effectiveness of occupational health services, including a comprehensive evaluation of services at ten sites across the DOE complex. Dr. Salazar emphasizes the importance of considering workers' perceptions and beliefs when designing and implementing health and safety programs. "Workers' experiences and knowledge can contribute substantively to the development of successful programs," she says. "Yet, often workers are not included in any stage of the planning process." This notion is supported by sev-

eral CRESP studies that describe the importance of collaboration and input among all parties involved in service delivery, including management, health and safety professionals and the workers themselves.

**Katherine Ertell, MS, CIH**, is Research Industrial Hygienist in the University of Washington School of Medicine. She has twelve years of experience in industrial hygiene and occupational health consulting for workers' compensation insurance, small business, health care, research, state government, and DOE. As on-site liaison for the Worker Safety and Health Task Group, she performs both technical and administrative responsibilities for the medical screening of former Hanford workers described in this issue. Among other projects, she has been extensively involved in evaluating the Employee Job Task Analysis as an occupational exposure instrument. She notes that, "CRESP makes a contribution by demonstrating that risk evaluation can be integrated across scientific concerns. This has offered me the chance to interact with people in disciplines that I might not otherwise encounter."

**Dr. Diana Kimberling, PhD**, is a Research Scientist in the School of Fisheries at the University of Washington. As a member of the CRESP-UW Ecological Health Task Group, she is developing the first terrestrial (land-based) Index of Biological Integrity (IBI), using insects collected from the Hanford site and the Idaho National Engineering and Environmental Laboratory (INEEL). Dr. Kimberling's previous research has included plant-insect interactions, biological control of insects, river bank plant community studies in the Grand Canyon, and population genetics of leopard frogs in the Southwest. Commenting on her current research, she says, "Being a part of this program is exciting because we are examining biological responses to human disturbance in a way that has not been done before in terrestrial systems. A terrestrial IBI will be very relevant to long-term stewardship issues at DOE sites."



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## REPORT FROM CRESP-EOHSI

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*by Lynn Washwell, PhD*

Dr. Dan Wartenberg, CRESP-EOHSI Data Characterization, Analysis and Statistics Task Group Leader, presented the results of a Savannah River Site (SRS) Worker Mortality Study to the SRS Citizens Advisory Board (CAB) on November 15. This work built upon and improved previous studies by including more workers, women and minorities and a longer follow-up time. Dr. Wartenberg also investigated a possible leukemia-tritium link, upon request of an SRS-CAB subcommittee. Overall, he found that workers at SRS have lower mortality rates than average Americans. Leukemia rates in white males were found to be normal. Dr. Wartenberg described alternatives for the SRS-CAB to consider when recommending future study of the leukemia-tritium link, given the limitations of available data about tritium doses workers may have received.

Dr. Lynn Washwell, CRESP-EOHSI Director of Outreach and Communication, and Dr. Joanna Burger, CRESP-EOHSI Ecological Health Task Group Leader, have initiated a study to evaluate risk communication messages understood after people fishing along the Savannah River read a fish fact sheet. This fact sheet, which provides information about consumption of contaminated fish on the Savannah River, was developed and endorsed by the South Carolina Department of Health and Environmental Control (SCHEC), DOE, the Environmental Protection Agency (EPA) and the Georgia Department of Natural Resources. The study will assist in the development of future targeted communication strategies and materials in the future.

The CRESP-EOHSI Remediation Technology and Exposure Assessment Task Group, led by Dr. David Kosson, is developing a tool to evaluate soil vapor extraction, air sparging and realistic endpoints for cleanup through examining new technologies used in cleaning up a SRS burning rubble pit with a trichloroethylene (TCE) plume. DOE, Westinghouse, SCDHEC and EPA are contributing data to use in developing and refining the tool.

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## OPENNESS REPORT COMPLETED

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*by Todd Martin, MS*

The Hanford Openness Workshops (HOW) recently concluded their 1999 series by approving and adopting a report entitled, "Is Openness Working?—A Progress Report" and fact sheets on nine openness-related topics. The Workshops are intended to resolve issues impeding the availability of information important to public health, the environment, understanding and decision making at Hanford. They receive facilitation, coordination and technical assistance from CRESP-UW's Outreach and Communication Task Group.

The report contains an overview of the Workshops, followed by progress reports on employee openness, information tools, declassification, public involvement, performance measures and tribal openness. It concludes with lessons learned and next steps. At DOE's request, the report also contains positive and negative examples for each of the above areas.

The Workshops have provided a unique opportunity for DOE personnel and HOW participants to interact directly. It is rare that those working directly on issues affecting openness actually meet with stakeholders and tribes. If openness efforts are to be successful, the understanding and working relationships developed in events such as these will continue to be a necessity.

The Report was recently presented to DOE-Richland Manager Keith Klein and Office of River Protection Manager Richard French. It is currently being printed and will soon be distributed more widely. HOW Participants intend to meet with DOE-Richland senior managers to discuss the report and how openness efforts at Hanford should move forward. The Progress Report and fact sheets will also be available at [www.hanford.gov/boards/openness](http://www.hanford.gov/boards/openness) or by contacting HOW Facilitator Michael Kern at (206) 616-3719, [mkern@u.washington.edu](mailto:mkern@u.washington.edu). The HOW Spokesperson is Mary Lou Blazek, (503) 378-5544, [mary.l.blazek@state.or.us](mailto:mary.l.blazek@state.or.us).

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