



**C R E S P**

# CRESP UPDATE *Hanford*

THE CONSORTIUM FOR RISK EVALUATION WITH STAKEHOLDER PARTICIPATION IS FUNDED BY THE U.S. DEPARTMENT OF ENERGY TO PROVIDE RESEARCH AND DEVELOPMENT OF RISK-BASED DECISION-MAKING TOOLS FOR USE IN THE CLEAN-UP OF THE NATION'S NUCLEAR WEAPONS COMPLEX. **SPRING 1999**

## CRESP TESTIFIES ON PROPOSED BERYLLIUM PROTECTION RULES

**CRESP-UW**  
Univ. of Washington  
Dept. of Envir. Health  
Box 354695  
Seattle, WA 98195-4695  
(206) 616-7377  
fax: 616-4875  
cresp2@u.washington.edu

**CRESP Headquarters**  
EOHSI, UMDNJ/RU  
317 George Street  
New Brunswick, NJ 08901  
(732) 235-9601  
fax: 235-9607  
cresp@eohsi.rutgers.edu

[www.cresp.org](http://www.cresp.org)

**Management Board:**  
Elaine Faustman, PhD  
Bernard Goldstein, MD  
John A. Moore, DVM  
Charles Powers, PhD

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is published by CRESP-  
UW's Outreach &  
Communication Task  
Group. To provide  
information or be added to  
the mailing list, contact  
Michael Kern,  
(206) 616-3719,  
mkern@u.washington.edu

Consortium  
for  
Risk Evaluation  
with  
Stakeholder  
Participation

by John Abbotts, PhD

In an example of how research can be relevant to policy matters, Dr. Rafael Ponce, Technical Director of the CRESP-UW Health Hazard Identification Task Group, testified in February before a US Department of Energy (DOE) hearing panel in Washington, D.C. The panel, which included DOE Assistant Secretary for Environment, Safety, and Health David Michaels, convened to take oral testimony on proposed rules for protecting workers from beryllium.

Beryllium is a rare, lightweight metal which, because of its physical properties, was used widely at DOE sites in such applications as casings for nuclear weapons material, reactor shielding and fuel rod fabrication. Consequently, this metal may be encountered during decommissioning and decontamination activities.

Exposure to respirable particles can cause acute and chronic lung disease. Engineering controls have essentially eliminated acute beryllium effects in exposed workers, but chronic beryllium disease (CBD, a pulmonary inflammation mediated by an immune response) has been observed in the DOE workforce, even at exposure levels below current federal standards.

About one percent of beryllium-exposed DOE workers have developed CBD, with the rate reaching ten percent or higher among specific job categories, such as machinists. The disease has also been observed among workers indirectly exposed, including office staff and custodians in buildings containing beryllium, and spouses of exposed workers.

"We hope CRESP's testimony and comments can contribute to an effective occupational health program for beryllium."  
- Dr Rafael Ponce, CRESP-UW

CRESP research provided a background to respond to a DOE notice inviting formal public comments on proposed federal rules for a CBD Prevention Program. CRESP had also previously submitted comments on a DOE Interim Program, established in 1997. In its February testimony, CRESP recommended tighter standards for occupational exposure and stronger anti-discrimination provisions for workers with beryllium sensitization, among other topics.

In March, CRESP supplemented the oral testimony with more detailed written comments, covering additional subjects such as medical evaluation, industrial hygiene practices, economic analysis and genetic counseling. Four CRESP-UW Task Groups contributed to the oral testimony and written comments. Said Dr. Ponce, "We hope CRESP's testimony and comments can contribute to an effective occupational health program for beryllium that meets budget guidelines, technological capabilities and public health goals."

Interdisciplinary CRESP investigations on beryllium pursue three major research areas. The Worker Safety and Health Task Group is conducting medical evaluation of former Hanford workers for CBD and beryllium sensitization, a precursor

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## CRESP TESTIFIES ON BERYLLIUM (CONTINUED FROM PAGE 1)

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to disease (see the Winter 1999 issue of *CRESP Update: Hanford*).

Laboratory work carried out by the Health Hazard Identification Group aims to develop more sensitive techniques for analyzing blood samples. The standard test for beryllium sensitization, the Lymphocyte Proliferation Test (LPT), has shown some variability across performing laboratories. CRESP research is pursuing the use of more sophisticated cell-sorting techniques, which may be more reliable and sensitive, as well as offering the opportunity to examine cellular mechanisms of disease.

Another project of the Health Hazard Group is "value of information" (VOI) research, which applies formal decision analysis to evaluate benefits from predicted disease reduction that might result from using genetic biomarker information in job task assignment or medical monitoring programs. Because CBD is mediated by an immune response, individual genetics can increase the risk of disease. CRESP's VOI research has identified strategies that are favorable from the standpoints of protecting worker health, reducing disease and overall financial cost.

However, any genetic testing program has social, legal and ethical ramifications. CRESP researchers recommended that these should be carefully considered and resolved through open dialogue with all involved parties before testing occurs.

A CRESP publication describing the VOI research is **The Value of Information Analyses for Biomarkers: Susceptibility to Chronic Beryllium Disease at US DOE Sites** by Bartell, Ponce, Takaro, Omenn, Zerbe and Faustman, American Nuclear Society, Proceedings of the Topical Meeting on Risk-Based Performance Assessment and Decision Making, April 1998.

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## REPORT FROM CRESP-EOSHI

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by Lynn Waishwell, PhD

Preliminary results of CRESP-EOSHI's update of the Savannah River Site (SRS) **worker cohort mortality study**, coordinated by the DCAS Task Group, were reported to workers, management and the Environmental Restoration/Waste Management Subcommittee of the SRS Citizens Advisory Board in February 1999. The number of white, male SRS workers dying from leukemia has dropped from a higher-than-normal rate in the 1960s. Over the entire period of SRS operations, white workers, on average, are no more and no less likely to die of leukemia than the US population.

The Ecological Task Group group completed a **study of fish consumption patterns** for people fishing the Savannah River adjacent to SRS. To understand the risk from these patterns, researchers are analyzing contaminants in several fish species, including top-level predators. A new project to determine **whether abnormalities in tadpoles can be used as an indicator of environmental stress** is also underway. Tadpoles would be useful indicators because they occur in a wide range of stream and pond types and are present for differing periods of times.

The SLUDGE Task Group began a project with DOE-HQ to develop a **model process for integrating site and community planning at DOE facilities**. Researchers will evaluate how to establish a direct and lasting relationship between site and local officials responsible for land use and develop a draft guidance document. They will then test the process at one or two pilot sites.

For more information, contact Lynn Waishwell, CRESP-EOSHI Outreach and Communication, at (732) 445-0920 or lwaishwe@eohsi.rutgers.edu.

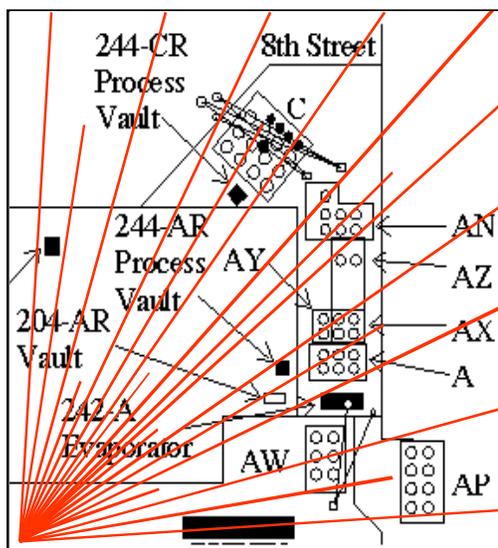


CRESP is a university-based national organization created to provide information for risk-based clean up of complex contaminated environments. CRESP was formed in response to a request by the Department of Energy and the National Research Council for the creation of an independent institution for integrating 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

Remote sensing techniques developed by the CRESP-UW Exposure Assessment Task Group offer the opportunity for real-time mapping of air pollutants. This can allow more comprehensive evaluations of risk to workers and others from gaseous emissions at Hanford and elsewhere.

The method employed, Open-Path Fourier Transform Infra-Red (OP-FTIR) spectroscopy, is a well-accepted optical remote sensing technology for



CRESP's non-overlapping OP-FTIR array, overlaid on the Hanford 200 East area

measuring air contaminants. The OP-FTIR instrument sends infrared light out through a contaminant plume along an open path up to one kilometer long. The OP-FTIR detects the absorbance of light energy as a function of wavelength, generating a spectrum. This spectrum can provide information on composition and concentration of many substances in the atmospheric plume. This information can be determined over intervals as short as a few seconds.

Usually, OP-FTIR systems pass the light beam along a single, fixed path. With this arrangement, researchers can determine average or maximum concentrations of contaminants along the beam path. A disadvantage is that airborne contaminants cannot be resolved in space; the location of the highest levels of contaminants cannot be determined from sensing data alone. The Exposure Assessment group has devised techniques to overcome this disadvantage, deploying a non-overlapping array of reflectors at different distances and positions, and developing a computer program to convert readings into a map of pollutant concentrations. This technique was tested and verified in a wind tunnel.

The Task Group has also taken the OP-FTIR into the field to monitor emissions from air exhaust stacks at Hanford "tank farms." These large tanks contain highly radioactive liquid waste. Heat, radioactivity and chemical reactions can produce gaseous by-products from the breakdown of the waste. These gases may be continuously released or may become trapped in the waste and released by a physical disturbance, such as waste transfer.

CRESP investigators Dr. Ram Hashmonay and Robert Crampton recorded baseline OP-FTIR measurements when no tank transfer operations were taking place at the AW and C farms in the Hanford 200 East Area. Then, in February and March 1999, they monitored C farm locations during waste pumping operations. Preliminary analysis identified hydrocarbons and nitrous oxide as the major species released and showed a strong correlation between these species over time. OP-FTIR remote measurements of volatile organic compounds were in good agreement with data from an analyzer taking direct measurements from a ventilation stack.

During these test field measurements, air emissions were tightly controlled and monitored through the stack. However, there are many possible emission points and it is not feasible to equip all the tanks with air monitors. For future work, the Exposure Assessment group hopes to deploy an array of reflectors and develop an emission map over a tank farm area.

"We're quite excited by the continued interest and cooperation expressed by DOE and Hanford contractors in this project," noted Dr. Michael Yost, OP-FTIR project leader. "This may offer a cost-effective way to locate and identify emissions."

A recent CRESP publication describing this method is **Computed Tomography of Air Pollutants Using Radial Scanning Path-Integrated Optical Remote Sensing** by Hashmonay, Yost and Wu, *Atmospheric Environment* 33, 267-274, 1999.

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## HANFORD OPENNESS WORKSHOPS MEET WITH HANFORD MANAGERS; SPOTLIGHT TRIBAL OPENNESS ISSUES

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*by Michael Kern, MPA*

The CRESP-UW Outreach and Communication Task Group continues to facilitate and coordinate the Hanford Openness Workshops (HOW), designed to help the US Department of Energy (DOE)-Richland Operations Office (RL) and DOE-Headquarters resolve issues impeding the availability of information important to public health, the environment, understanding and decision making at the Hanford Nuclear Site in eastern Washington.

The second and third workshops of the 1999 series were held back-to-back on April 8 and 9 in Richland, Washington. These workshops featured interactive, small group discussions between DOE-RL program managers and HOW working groups on declassification, information tools, employee openness and public involvement. All four groups had productive discussions, agreeing on specific outcomes that both participants and program managers felt would demonstrate real progress on openness at Hanford and could be achieved by the end of the 1999 series.

Up next is the Tribal Openness Workshop on June 2, 1999 in Spokane, Washington. The HOW is hosting this special workshop to focus on the unique concerns and priorities of tribes and tribal nations regarding information access, cultural resources, environmental protection and other aspects of open and transparent decision making at Hanford and across the DOE complex. This workshop will also focus on the fiduciary responsibilities, treaty obligations and intergovernmental policies which necessitate openness towards the tribes at DOE. The HOW Tribal Openness Working Group intend this workshop to provide a platform for interactive discussion and cultural education.

If you are interested in participating and/or being kept informed of the results of the Tribal Open-

ness Workshop or the HOW in general, please contact CRESP-UW Outreach Coordinator/ HOW Facilitator Michael Kern at (206) 616-3719, mkern@u.washington.edu or HOW Spokesperson Mary Lou Blazek at (503) 378-5544, mary.l.blazek@state.or.us. The HOW web site is at <[www.hanford.gov/boards/openness/index.htm](http://www.hanford.gov/boards/openness/index.htm)>.

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## CRESP INITIATES HANFORD 100 AREA REVIEW PROJECT; SOLICITS STAKEHOLDER PARTICIPATION

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*by John Abbotts, PhD*

At a public meeting on February 10, 1999, Washington state agencies and the US Environmental Protection Agency (EPA) reported that soil remediation in the Hanford 100 Area has progressed to a point where several sites are considered to have achieved cleanup goals as specified in the 1995 Record of Decision (ROD).

CRESP is interested in understanding how risk information is developed and used in management planning and in determining that remediation goals are achieved. After initial discussions with EPA, CRESP proposed to review cleanup documentation (called "verification packages") at selected 100 Area locations. One project goal is to gain an experience base that may be generalized across other 100 Area sites.

Dr. Jack Moore, President of the Institute for Evaluating Health Risks (IEHR) in Washington, DC and CRESP Director of Science Coordination, will coordinate the CRESP review, with participation from IEHR's Kieran McCarthy and Dr. William Griffith, Technical Director of the CRESP-UW Data Characterization, Analysis and Statistics Working Group.

CRESP has contacted Tribal Nations and stakeholders to solicit their views and interests on this project. As Dr. Griffith explained, "This is an excellent opportunity to solicit the views of stakeholders and Tribes, and to incorporate their ideas into the cleanup."





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## CRESP RELEASES RESEARCH REPORT ON HANFORD TANK WASTES

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by *John Abbotts, PhD*

In February, the Social, Land Use, Demographic, Geographic, and Economic (SLUDGE) Task Group released a CRES-OW research report, "High-Level Waste at Hanford: Status Report and Identification of Issues," by Dr. Thomas Leschine, Aimee Guglielmo, John Abbotts and Francesca Lo. This report is designed to provide context for targeted investigations by identifying issues—scientific, technical, regulatory and institutional—pertinent to waste management at Hanford.

Past practices of the US Department of Energy (DOE) and its predecessor agencies devoted to atomic weapons production generated large amounts of waste materials and contaminated the environment. Now that such production activities have ended at Hanford (and, for the most part, at other DOE sites), the nation is faced with an urgent need for environmental management and remediation.

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"This report underscores the considerable technical complexity of retrieving and immobilizing the Hanford tank wastes ... How stakeholders will be involved in numerous complex decisions to come is an important issue for CRES-OW."

- Dr. Tom Leschine, CRES-OW

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At Hanford, highly radioactive liquid wastes generated over decades of plutonium production are stored in 177 large tanks, collectively containing over 50 million gallons. These wastes represent a wide variety of physical, chemical and radiological compositions, reflecting different origins, different subsequent chemical treatments and frequent transfers between tanks. How to safely manage and process the Hanford tank wastes remains a serious technical and institutional challenge.

Immobilizing the liquid wastes would improve stability and facilitate long term management, but progress in this area has been limited. Construction of facilities to vitrify the wastes to a glass form has yet to begin. Immobilization of wastes is not expected to be completed before the middle of the next century, even under optimistic projections. Moreover, construction and operation of vitrification facilities are planned under a privatization approach that represents a departure for DOE.

The present status and future disposition of Hanford tank wastes has been a major concern of Tribal Nations and local and regional stakeholders, and has attracted considerable attention from regulatory agencies, Congress and members of the scientific community. Cleanup at Hanford is regulated through a Tri-Party Agreement, first negotiated in 1989 among DOE, the US Environmental Protection Agency and the Washington State Department of Ecology.

Dr. Leschine, CRES-OW SLUDGE Task Group Leader, remarked, "This report underscores the considerable technical complexity of retrieving and immobilizing the Hanford tank wastes, an effort that is only just beginning despite many years of concern. How stakeholders will be involved in numerous complex decisions to come is an important issue for CRES-OW."

One appendix to the CRES-OW research report describes major stakeholder groups and connections among them. A second describes major milestones of the Tri-Party Agreement and subsequent amendments. The research report provides a background for investigations into more specific topics, including an examination of how decision making strategies consider the concerns of interested stakeholders, and an assessment of the process for technology development and deployment to manage the tank wastes.

## CONTACTING CRESP

**Outreach & Communication, Michael Kern**  
(206) 616-3719, mkern@u.washington.edu

**Health Hazard Identification, Rafael Ponce**  
(206) 616-7376, rponce@u.washington.edu

**Data Characterization, Analysis, & Statistics,  
Bill Griffith**  
(206) 616-9134, griffith@u.washington.edu

**Remediation Technology, David Stensel**  
(206) 543-9358, stensel@u.washington.edu

**Exposure Assessment, John Kissel**  
(206) 543-5111, jkissel@u.washington.edu

**Social, Land Use, Demographic, Geographic,  
and Economic, Tom Leschine**  
(206) 543-0117, tml@u.washington.edu

**Ecological Health, James Karr**  
(206) 685-4784, jrkarr@u.washington.edu

**Worker Health and Safety, Tim Takaro**  
(206) 616-7458, ttakaro@u.washington.edu



CRESP-UW  
Department of Environmental Health  
Box 354695  
Seattle, WA 98195-4695

*address correction requested*

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## CALENDAR

June 2, 1999, Hanford Openness Workshop #4, "Tribal Openness Concerns," Spokane, WA.

June 4, 1999, Deadline to submit proposed presentations for the Health of the Hanford Site Conference (see below).

September 7 & 8, 1999, Hanford Openness Workshop #5: "Is Openness Working?--A Progress Report from Stakeholders," Seattle, WA.

November 2 and 3, 1999, Health of the Hanford Site Conference, Richland, WA.

*Contact CRESP-UW for information on calendar items*

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