



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. SUMMER 1999

CRESP EXAMINING EXPOSURE TO TOXIC SUBSTANCES THROUGH SOIL

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Consortium
for
Risk Evaluation
with
Stakeholder
Participation

by John Abbotts, PhD

The CRESP-UW Exposure Assessment Task Group, led by Dr. John Kissel, is conducting three main projects to advance knowledge about exposures of individuals and populations to toxic substances. One project, led by Dr. Michael Yost, uses spectrometry to evaluate the composition of gaseous emission plumes (see *Spring 1999 issue*). A second project, led by Dr. Timothy Larson, is developing instrumentation to measure relatively large airborne particles that may contribute to the release and distribution of toxic substances from cleanup sites when soils are disturbed.

A third project, led by Dr. John Kissel, evaluates exposures that occur not through the air, but 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."

Because cleanup decisions involve judgements on relative health risks and remediation costs, sound decision making requires accurate exposure projections. Risks remaining after cleanup can be driven by land use patterns. For some contaminants, soil exposure pathways may be significant for activities such as farming or residential use. Therefore, an important part of a safe and effective remediation is understanding these pathways for occupational exposures during cleanup and residential exposures afterward.

Research conducted by Dr. Kissel's team has improved knowledge about soil adherence to skin and behavior patterns that might lead to contact with soil. In the absence of detailed data, U.S. Environ-

mental Protection Agency (EPA) standard soil exposure models depend on "default" assumptions. CRESP researchers evaluated the amount of soil that remained attached to skin after activities ranging from indoor recreation to outdoor occupational tasks. This 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 higher levels 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 gathered details on the proportion of the population that participate in these activities and revealed that a

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large majority of respondents participate in one or more. Data from a follow-up survey of children's play behaviors are currently being analyzed. Says Dr. Kissel, "The goal is to combine the data on soil adherence with the data on activity patterns to produce representative estimates of dermal soil contact for adults and children in residential settings."

Some of the results from these projects were reported in **Field Measurement of Dermal Soil Loadings in Occupational and Recreational Activities**,

(continued on bottom of page 4)



by Todd Martin, MS

An important role for CRESP is to enhance communication between the research community and the public. On November 2 and 3 in Richland, Washington, CRESP and several co-sponsors will provide a prime opportunity for the public and scientists to discuss and evaluate the health of the Hanford Nuclear Site. The third annual Conference on the Health of the Hanford Site presents an opportunity to exchange views, present research findings and discuss what should be done relating to ecological, community and occupational health at Hanford.

An important and unique aspect of the conference is that it allows citizens, site workers and researchers to interact directly. Citizens and workers can learn from researchers' work, while input from citizens and workers can lead to research that better reflects their concerns. Given the importance of these interactions, the sponsors are urging broad attendance. "We're hoping for strong participation from the public," said Dr. Tim Takaro, Chair of the Health of the Site Organizing Committee, "In Hanford, we've got the largest environmental cleanup effort in history happening right here in the Northwest. The conference is a great chance for people to learn about it, get involved and express their opinions."

The conference will address a broad range of topics in the areas of ecological, worker and public health. The new Office of River Protection (ORP) will be a topic of much interest. ORP was created by Congress to provide a somewhat autonomous entity at Hanford tasked with retrieving, treating and disposing of Hanford's 54 million gallons of high-level radioactive tank waste. With waste leaking toward the Columbia River, the importance of this cleanup effort is obvious. What is less evident is exactly how the ORP will differ from past efforts, how it will better ensure success and how it

should be evaluated as the mission progresses. Discussions at the conference will attempt to shed light on these important issues.

The Hanford Thyroid Disease Study, Individual Dose Assessments, dose reconstruction and medical monitoring issues have all been of recent interest to the public and researchers. The conference will feature discussions into the science surrounding many of the efforts to understand past Hanford contamination releases and potential health impacts.

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In the worker health and safety arena, the toxic metal beryllium will be of particular interest this year. The first comprehensive results from studies of over 300 former Hanford workers exposed to beryllium will be presented, along with a beryllium exposure assessment of over 50 Hanford buildings.

For registration, conference program and other information, visit the Health of the Site Conference website at <http://depts.washington.edu/cresp2/hos> or call CRESP at (206) 616-7377. The early registration deadline is October 1.

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.



IMPROVING RADIATION DOSE MODELS FOR RISK ASSESSMENTS

by John Abbotts, PhD

Dr. William Griffith, Director of the CRES P-UW Data Characterization, Analysis, and Statistics Group, recently served on a scientific committee convened by the National Council on Radiation Protection and Measurements (NCRP), a non-profit organization chartered by the U.S. Congress in 1964. NCRP is chartered to develop and disseminate in the public interest information and recommendations about radiation protection, among other responsibilities.

The committee evaluated the mathematical models used to determine radiation doses for use in risk assessments. Such models calculate doses to a typical individual, assuming continuous ingestion or inhalation of given radionuclide concentrations. Federal limits for radionuclides in air or water are based on these models; if concentrations stay below these limits, radiation doses should not exceed regulatory standards.

The scientific committee issued a formal commentary, intended to 1) indicate strengths and weaknesses of models used to estimate doses; 2) show that large variabilities exist due to an individual's age, disease state and other parameters; and 3) dispel the notion that a single dose estimate will apply to the entire population. The report reviewed models of the digestive tract, lung, distribution within the body and dose calculations. It also reported opinions of committee members on the possible magnitude of errors made by a model for specific radionuclides.

Dr. Griffith commented, "Serving on the committee was stimulating because the members were very thorough in looking at sources of uncertainty, and made specific recommendations for significant changes in the models."

NCRP has no regulatory authority, but its publications often represent scientific consensus on particular topics, and may be considered by regula-

tory agencies. The NCRP report is titled **Evaluating the Reliability of Biokinetic and Dosimetric Models and Parameters Used to Assess Individual Doses for Risk Assessment Purposes**, NCRP Commentary No. 15, Bethesda MD, 1998.

RESEARCH UPDATES

by John Abbotts, PhD; Michael Kern, MPA

The Winter 1999 issue described the Remediation Technology Task Group, including research of Dr. Joel Massmann associated with removal of carbon tetrachloride from the vadose zone in the Hanford 200 West area. Results from that collaborative project were recently published as Ellerdt, Massmann, Schwaegler, and Rohay, **Enhancements for Passive Vapor Extraction: The Hanford Study**, *Ground Water* 37, 427-437, 1999.

The Spring 1999 issue described the work of the Exposure Assessment Task Group to employ Open-Path Fourier Transform Infra-Red (OP-FTIR) spectroscopy to measure gaseous emissions at the Hanford site. A refinement of the FTIR methodology has been published as Hashmonay and Yost, **On the Application of OP-FTIR Spectroscopy to Measure Aerosols: Observations of Water Droplets**, *Environmental Science & Technology* 33, 1141-1144. This paper was highlighted as important research in the June 1, 1999 issue of *Analytical Chemistry*, 370A-371A.

The Spring 1998 issue described the Ecological Health Task Group's work to adapt the Index of Biological Integrity to plants and insects, in order to help detect and understand the biological effects of human actions at Hanford. Task Group leader James Karr recently spent five days in Panama advising USAID, the Panama Canal Commission and Panama's environment agency on how to use the Index to track the health of the Panama Canal watershed.



by Todd Martin, MS

The intent of this column is to provide a look at the people behind CRESP's work and the broad range of experience and expertise CRESP brings together. In this issue, we feature three investigators whose work is described in this newsletter.

Dr. Tim Takaro is Attending Physician at the University of Washington (UW) Occupational and Environmental Medicine Clinic and faculty member in the School of Medicine. As Technical Director of the Worker Health and Safety Task Group, Dr. Takaro brings expertise in medical surveillance and the use of biomarkers in a clinical occupational health setting. He sits on the Hanford Advisory Board (HAB), HAB Health and Safety/Waste Management Committee and the Hanford Occupational Health Process Advisory Council. Dr. Takaro works on several studies involving the Hanford workforce, including evaluation of beryllium sensitization, medical surveillance for former workers and investigation of combined exposures contributing to pulmonary fibrosis. In addition, Dr. Takaro is the Chair of the Health of the Hanford Site Organizing Committee. "A safe, effective cleanup relies upon a research community informed by public concerns and a public informed by sound research," says Dr. Takaro. "It's an important symbiotic relationship and much is lost if the public and researchers aren't communicating effectively. That's what makes the Health of the Site conference so important."

Dr. Bill Griffith is a Research Scientist at the UW Department of Environmental Health (DEH) and Technical Director of the Data Characterization, Analysis and Statistics Task Group. He is a member of the National Council on Radiation Protection's committees on Interspecies Extrapolation, Uncertainties in Metabolic Models, and Radiation Dose Response for the Lung. He received the Society of Toxicology's Frank R. Blood Award for the paper of the year and two Inhalation Specialty Section awards for paper of the year. Dr. Griffith was trained

as a biostatistician and has published in many areas pertaining to understanding the effect of radiation dose on the human body. "It is important to get the message to regulators that there can be a lot of uncertainty in some dose estimate models," says Dr. Griffith. "I know it is a stakeholder concern. I'm glad the NCRP committee provided an opportunity."

Dr. John Kissel is Associate Professor at UW DEH. His CRESP activities include directing research on dermal and respiratory exposure analysis as Co-Leader for CRESP-UW's Exposure Assessment Task Group. "The exposure analysis work is intended to aid selection of cleanup standards and/or land use options at Hanford and other DOE sites," he says. His research area can be broadly described as human exposure assessment. He is currently a Councilor of the International Society of Exposure Analysis and former Chair of the Exposure Assessment Specialty Group of the Society for Risk Analysis. He has also served as the working group co-coordinator for a Workshop on Improving Exposure Analysis for DOE Sites.

We Want to Hear From You!

CRESP Update: Hanford is a valuable mechanism for communicating CRESP's work to stakeholders and tribal nations. We want to be sure that it is a useful informational tool for the reader. Please mail, fax, phone or email us via the numbers and addresses listed on the front of this newsletter to let us know how we are doing:

- Is the content of the newsletter presented in an understandable, useful manner?
- Is the research described clear and useful?
- How could CRESP's newsletter and research be more responsive to your needs?

(Soil Exposure Pathways, continued from page 1)

by Holmes, Shirai, Richter, and Kissel, Environmental Research Section A 80, 148-157, 1999; and **Adult Responses to a Survey of Soil Contact-Related Behaviors**, by Garlock, Shirai, and Kissel, Journal of Exposure Analysis and Environmental Epidemiology 2, 134-142, 1999.



HANFORD OPENNESS WORKSHOPS FOCUS ON TRIBAL ISSUES, PROGRESS REPORT

by Michael Kern, MPA

The Hanford Openness Workshops (facilitated and coordinated by the Outreach and Communication Task Group) held a special Tribal Openness Workshop on June 2 and are now preparing to conclude the 1999 series with a Progress Report. The Workshops are designed to help the US Department of Energy (DOE)-Richland Operations Office 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 southeastern Washington state.

Around 40 representatives of Indian and non-Indian governments and organizations attended the Tribal Openness Workshop to focus on the unique concerns and priorities of tribes and tribal nations regarding open and transparent decision making at Hanford and across the DOE complex. The Workshop featured roundtable discussions on involving tribes in the declassification process, protecting cultural resources while preserving privacy, and fostering an open and "government-to-government" decision making environment.

Outcomes include a Tribal Openness Concerns Fact Sheet (available soon, along with the Workshop summary, at <www.hanford.gov/boards/openness/>) and a series of planned information sessions between the Hanford Declassification Project and individual tribes.

The final workshop in the 1999 series will be held September 7 and 8 in Seattle and will focus on reviewing the Workshops' draft 1999 Report. The report will include 1999 Workshop 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

(206) 616-3719, mkern@u.washington.edu or HOW Spokesperson Mary Lou Blazek at (503) 378-5544, mary.l.blazek@state.or.us.

REPORT FROM CRESP-EOHSI

by Lynn Waishwell, PhD

The Social, Land Use, Demographic, Geographic and Economic Task Group-EOHSI has studied **fluctuations in unemployment rates, income and industrial make-up in three counties near the Savannah River Site (SRS)** over the past 45 years. Aiken County, adjacent to the site, was found to be the most dependent on continued DOE funding of SRS and the most susceptible to downturns in site employment. Local officials and economic development experts were interviewed regarding site impacts and their attitudes towards DOE and its contractors. Similar analyses of regions surrounding Hanford and the Idaho National Engineering and Environmental Laboratory were conducted. For more information contact Henry Mayer at (732) 781-9860 or hmayer@eden.rutgers.edu. Other Task Group reports are available via Karen Lowrie, (732) 932-0387, klowrie@rci.rutgers.edu.

A joint project between the Remediation Technology and Exposure Assessment Task Groups at EOHSI is **estimating background concentrations, or widely diffuse chemicals and radionuclides in the groundwater** that cannot be attributed to a specific source of contamination at SRS prior to the start of nuclear materials production. This information can help identify appropriate cleanup targets and determine the cost effectiveness of groundwater remediation options. Preliminary findings were recently presented to the site contractor and DOE. A report is being finalized and will be submitted for scientific peer review.

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

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CALENDAR

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

October 1, 1999, early registration deadline, Health of the Hanford Site Conference, Richland, 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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