



CRESP Update

Savannah River

Volume 4 ■ Number 2 ■ May 1999

Task Group Reports

Ecological Health	2
Health Hazard Identification	3
Social, Land Use, Demographic, Geographic, and Economic	3
Outreach and Communication	4
Worker Safety and Health	4
CRESP-University of Washington ...	5

Other Notes

Examining Risk at SRS	5
CRESP Sponsors Meeting to Discuss Responsive Science	5



CRESP Headquarters

Plaza II ■ 317 George Street
New Brunswick, New Jersey 08901
Vite: 732-235-9600 ■ Fax: 732-235-9607
Charles W. Powers, PhD ■ Executive Director

CRESP-EOHSI

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

CRESP-UW

University of Washington
Department of Environmental Health
PO Box 354695
Seattle, Washington 98195
Vite: 206-616-4874 ■ Fax: 206-616-4875

Management Board

Elaine M. Faustman, PhD
Bernard D. Goldstein, MD
John A. Moore, DVM
Charles W. Powers, PhD

Leukemia Risk Normal for SRS Workers

By Dan Wartenberg, Data Characterization, Analysis, and Statistics Task Group Leader

Preliminary results of CRESP's update of the SRS worker mortality study were rates reported to workers, management and the Environmental Restoration/Waste Management Subcommittee of the SRS-CAB in February 1999.

Two important results were described. First, the observed leukemia excess among white males, reported by Dr. Donna Cragle of the Oak Ridge Institute of Science and Education in her earlier study of the SRS group, has decreased over time. Over the entire length of the CRESP study, SRS workers are no more and no less likely to die of leukemia than the U.S. population. The previously identified excess of leukemia deaths that occurred in the mid-1960's has not continued.

Second, the workers at SRS have a lower risk of death

throughout the study period than the U.S. population. This lower risk is to be expected. It is known as the "healthy worker effect," since the general U.S. population includes some people who are not healthy enough to work. In addition, the SRS workers have had a lower risk of dying of cancer than the U.S. population.

The study was designed to expand and extend the previous mortality study of white male workers at SRS by including white and African-American women, as well as African-American men. The study also evaluated the causes of death of workers through 1995, nine years beyond the previous work.

Over the next several months, CRESP researchers will look in more detail at patterns of specific causes of death in SRS workers and make suggestions for further follow up.

CRESP Task Group Leaders at EOHSI

Data Characterization, Analysis, and Statistics
Dan Wartenberg, PhD

Ecological Health
Janna Burger, PhD

Exposure Assessment
Paul Lioy, PhD

Health Hazard Identification
Lynn Fahy/McGrath, PhD

Outreach and Communication
Lynn Waishwell, PhD

Remediation Technology
David Kossan, PhD

Social, Land Use, Demographic, Geographic, and Economic
Michael Greenberg, PhD

Worker Safety and Health
Michael Gochfeld, MD, PhD



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

Ecological Health

The Ecological Health Task Group is continuing with studies to 1) develop methods to assess the hazards and risks to organisms, populations, communities and ecosystems on the Savannah River Site and elsewhere, 2) understand the risk to humans and other consumers from wild fish and game, and 3) understand the perceptions of a wide range of stakeholders concerning ecological services, such as hunting and fishing. The projects at SRS are done in collaboration with scientists at the Savannah River Ecology Laboratory (SREL). Three of our current projects will be mentioned briefly: importance of wild fish and game as a source of protein in diets, contaminants in fish from the Savannah River, and development of abnormalities in tadpoles as a bioindicator of ecological stresses.

We are currently analyzing data collected at the Palmetto Sportsmen's Classic, where we interviewed people concerning the kinds and amounts of meat they ate in each month of the year. This will allow us to understand the role of wild game in both diet and the local culture, and will provide information useful to risk assessors as well as managers interested in potential recreational uses on SRS. Preliminary data indicates that, for the population interviewed, 96 % eat beef, 93 % eat chicken, 73 % eat restaurant fish and 66 % eat pork. Of wild caught game, 78 % eat deer, 78 % eat self-caught fish, 47 % eat dove, 38 % eat wild turkey, 27 % eat rabbit, 25 % eat duck and squirrel, and only 10 % eat raccoon.

Using an average number of meals for each month, and the portion size, we are examining the importance of wild game in the diets of sportsmen. Such information is useful in thinking about future land uses on sites such as SRS, as well as providing information for health risk assessments.

We completed our studies of fish consumption patterns of people fishing along the Savannah River from the Augusta Lock and Dam to the Route 301 bridge. To understand the risk from these consumption patterns, we are analyzing contaminants in several fish species collected from the Savannah River. We are analyzing a range of fish, including top level predators and those consumed by people fishing along the river.

Finally, we are investigating whether we can use abnormalities in tadpoles as an indicator of environmental stress. Animals living in aquatic ecosystems are often more at risk than terrestrial species because contaminants move more quickly in water than soil, tadpoles are in direct contact with the water, and they ingest soil while feeding. Tadpoles would be useful indicators because they occur in a wide range of different types of streams and ponds, and are present in the water for different periods of time. Bullfrogs, for example, exist over a year as tadpoles before they metamorphose into adult frogs, while other species such as Spring Peepers may take only a few weeks. Further, frogs occur throughout the United States, and the use of a tadpole bioindicator would be useful DOE complex-wide (except for the very dry sites). This project is also of

interest because of the recent worldwide declines in amphibian populations. The project is being led by Joel Snodgrass at SREL.

For information on any of the above projects, please email or call J. Burger at burger@biology.rutgers.edu or at 732-445-4318.

Health Hazard Identification

The Health Hazard Identification Task Group's overall goal is to study the effects of environmental contaminants on the health of exposed population. We recently completed an experimental study looking at the effects of mercury and radiocesium (^{137}Cs) on developing neurons, both chemicals detected in fish caught from the Savannah River. Mercury can cause harm to developing neurons, and ^{137}Cs is a carcinogen that may affect cell development. When combined, these chemicals conceivably may have a different, potentially stronger, effect. The interaction of their combination has never been evaluated in developing neurons.

Preliminary results show that harm to the specific type of cells studied is greater in the presence of both mercury and ^{137}Cs than when these cells were treated with either chemical individually. Currently, risk assessments for these two agents do not consider how they may act when combined. It may be important to evaluate the impact of this combination and other compounds in

conducting precise risk assessments. This experiment was conducted with a specific type of neuron cell in the laboratory. Future efforts will investigate how this combination of contaminants will affect living organisms.

A second area of study examines the bioavailability of contaminants, which is the internal amount of a chemical that is absorbed by the body and is available to cause a toxic effect. Currently, risk assessments that are done to assess this bioavailability are extremely expensive. CRESP is working to identify a screening method that will help prioritize the need for more extensive and expensive analysis. Soils from SRS L-Area Rubble Pile have been collected. These soil samples are being tested in three different systems: bacterial, live organisms, and a test using gastrointestinal fluids. The method using these body fluids is of special interest because it is based on the actual process that occurs in a human body to absorb contaminants.

By testing these methods, it will be possible to quantify the amount of a contaminant that is available to biological systems. The hope is to provide a simplified test system that can be used to screen site soil samples. This will enable risk assessors to better identify levels of contaminants that are of concern. This project is a joint project with Exposure Assessment and the Ecological Hazard Identification Task Group.

For more information, please contact Lynne McGrath at lmcgrath@eohsi.rutgers.edu or at 732-445-3287.

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

The Task Group continues a multifaceted study of several small sites where DOE (or its predecessor agencies) mined and milled uranium or produced different components for the U.S. nuclear arsenal. To date, all sites are closed, many are fully remediated, some are in the process of remediation.

In the first part of this study, the Task Group used census data for the tracts (U.S. Census defined areas) that contained 75 of these sites. The Group analyzed 49 demographic and economic features. The analysis showed distinct differences between people living in the areas immediately around the DOE sites and the surrounding counties. Most important, the differences in racial/ethnic composition and socioeconomic status suggest a potential for environmental justice issues.

The second part of this study involved interviewing officials from all of the communities that host either FUSRAP (Formerly Utilized Sites Remedial Action Program), UMTRA (Uranium Mill Tailings Remedial Action), or other small sites. Officials were asked about their concerns over the presence of the site, its clean up, and success of the remediation process.

The third part will look in depth at remediation and reuse of three sites: a FUSRAP site in St. Louis, MO; an UMTRA site in Gunnison, CO; and the Pinellas Site near Tampa, FL.

Another important project begun with the SLUDGE Task Group and

personnel at DOE Headquarters is underway, and will continue through much of 1999. It creates a model process for integrating site and community planning at DOE facilities. Results of interviews with local planning stakeholders have pointed to the need for this project. As DOE has moved from cleanup to reuse and eventual closure at some of its major sites, several major issues have emerged: future land use, public access, and institutional controls. Establishing a direct and lasting planning relationship between site and local officials responsible for land use planning is necessary. Such a relationship will ensure that essential information is exchanged, community land use concerns addressed, and integration of sites into regional development plans a success.

CRESP will study these issues and develop a draft guidance document. The Task Group will test and establish the process at one or two pilot sites. This initiative will support the Department's stewardship program. It will also integrate, as appropriate, other projects by the Long-Term Stewardship Working Group.

Our most recent report is entitled "The Impact of Investments in Outdoor Recreation on the Savannah River Economic Region, and the States of South Carolina and Georgia" (Report 21 of SLUDGE). Because stakeholder groups in the SRS, including the CAB, have recommended expanded recreation on the site, we used a multi-regional economic simulation model to analyze the economic impacts of increasing wildlife-related outdoor recreation spending in the region.

This report answers the question, "If opportunities for hunting and fishing were expanded, how would the increased amount of money that people would spend on equipment, food and lodging contribute to the regional economy?"

To date, the Task Group has 25 reports ready that document the Group's findings from surveys, interviews, case studies, demographic and economic data analysis as well as econometric modeling. For a list or more information, contact Karen Lowrie at klowrie@rci.rutgers.edu or at 732-932-0387 x 577.

Outreach and Communication

CRESP sponsored a team of four South Carolina educators to the final train-the-trainer ToxRAP Network workshop last January at EOHSI in New Jersey. This team returned to the Ruth Patrick Science Education Center (RPSEC) at University of South Carolina Aiken to train other teachers of the ToxRAP curriculum. ToxRAP (Toxicology, Risk Assessment and Pollution) is a three-module K-9 curriculum that teaches science and math within a risk assessment framework. The CRESP-sponsored team comprised three trainers from RPSEC and one Mixed Waste Manager Specialist from BNFL-SR (British Nuclear Fuels Limited-Savannah River).

This team will train up to 80 local K-8th grade teachers during the next two years. With additional support

from CRESP, the Ruth Patrick Science Center will supply curricular materials to teachers. Anyone interested in learning how to obtain ToxRAP training for their school or district may contact Lynn Waishwell, or Harriet Hare from the Ruth Patrick Science Center directly at 803-648-6851.

On April 22, Lynn Waishwell, Outreach and Communication Task Group Leader, participated in the Earth Day Celebration 1999 coordinated by the Citizens for Environmental Justice and the Harmabee House in Savannah, Georgia. During two events, the Religious Leaders' Breakfast at the First African Baptist Church and the Community Leaders' Luncheon held at the Savannah Technical Institute, she discussed upcoming projects of CRESP with local leaders. For further information, contact Lynn Waishwell at lwaishwe@eohsi.rutgers.edu or at 732-445-0920.

Worker Safety and Health

The Task Group prepared a half-day workshop for physicians and nurses who attended the recent annual American Occupational Health Conference in New Orleans. Health providers who live and work in communities around hazardous waste sites frequently receive questions from patients about potential exposures or health effects. Some providers can provide a thorough description of site conditions, exposures and potential

risks. Others cannot. The risk information can be complex, and utilized sources may provide differing information.

This workshop provides a freestanding curriculum that describes the problems of hazardous waste and the potential for exposure of onsite workers (including remediation workers) and nearby offsite residents. The curriculum can be valuable to clinicians who practice near any site. It gives basic information on the behavior of hazardous materials in the environment and includes clinical exposure assessment techniques.

The challenge is to provide a generalized framework that can be appropriate to conditions at any site. The local trainer would adapt the instruction to site-specific information useful for local clinicians.

For more information contact Mike Gochfeld at gochfeld@eohsi.rutgers.edu or at 732-445-2917.

CRESP-University of Washington

The Worker Safety and Health and Human Health Identification Task Groups CRESP-UW provided testimony this February to a DOE panel considering proposed rule changes for beryllium worker protection. The two task groups have collaborated over the past three years to 1) examine why some people are sensitized to beryllium, 2) develop more sensitive techniques to analyze blood samples, and 3) use "value of information" decision

analysis to evaluate the benefits of reduced disease and improve medical monitoring among potentially exposed workers.

Beginning the second year of Hanford Openness Workshops (HOW), the Outreach and Communication Task Group held a workshop on February 10 in Richland, Washington entitled "Response to HOW Report/Planning for 1999." This workshop brought together citizen advocates, tribal representatives, regional regulators, and academics with DOE-Richland program managers to review the HOW's 1998 recommendations and begin to chart a path forward to developing criteria for measuring and improving openness at the Hanford site. The high level of commitment from both participants and program managers resulted in the participants' decision to relocate April's meetings from Seattle to Richland, WA and structure a day-long working session with key personnel from the site.

OTHER NOTES

Examining Risk at SRS

The SRS-CAB is currently investigating how risk assessment and risk communication occurs at SRS. An effort coordinated by the Future Use Subcommittee of the SRS-CAB, four teams of CAB members and other stakeholders regularly meet to examine various aspects of risk assessment, risk management and risk communication. Many different risk

assessment protocols at SRS are used, and this Risk Working Group of the CAB is conducting a two-year process to thoroughly understand the similarities and differences between the risk assessment processes on site. The ultimate goal is to make recommendations to DOE and others to more efficiently prioritize efforts based upon risk, and better communicate their results.

Two CRESP scientists are actively participating with this effort. Lynne McGrath, Health Hazard Identification and Lynn Waishwell, Outreach and Communication, regularly participate in several of the teams working on this project.

CRESP Sponsors Meeting to Discuss Responsive Science

CRESP sponsored a meeting on April 12, "Responsive Science: Forging Regulatory Resolution at DOE Sites," in Washington, D.C. This meeting provided an opportunity for Department of Energy Headquarter officials, and USEPA officials to consider how new scientific data and technology can help to solve complex or chronic regulatory problems. Examples of CRESP science demonstrated how improved risk information can facilitate DOE site clean-up by helping to make a more efficient regulatory process. CRESP researchers from both University of Washington and EOHSI presented a broad range of topics. For more information, contact Charles Powers at 732-235-9600.

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



C R E S P