

RISK *newsletter*

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NRC Report on Pesticides and Children Spurs SRA Workshop

SRA is in the midst of organizing a workshop inspired by a National Research Council report on changes needed to protect children from pesticides in food.

The congressionally mandated report, titled "Pesticides in the Diets of Infants and Children," recommends that the federal government change some of its scientific and regulatory procedures to protect children from possible adverse health effects of pesticides in their diets.

The SRA workshop is a follow-up on the technical issues raised by the report, and it will focus on the methods of assessing the effect of exposure to multiple compounds on *all* sensitive populations, including the elderly. "Our tentative plans include an open meeting and a one- or two-day workshop of invited participants who will write a series of documents to be published in a special edition of the journal," said SRA President Jim Wilson.

At the workshop, which will be held October 13-15 at the Hyatt Regency Washington on Capitol Hill, the methods presented in the NRC report as well as other methods that have been proposed by other researchers in the field will be presented and discussed. Workshop participants will discuss the utility of each method in performing risk assessments and will identify areas in which more research is needed.

SRA members who are organizing the workshop include Wilson, Councilor Ann Fisher, Councilor David McCallum, Christine Chaisson, Gail Charnley, and Linda-Jo Schierow. SRA members who served on the National Research Council's Committee on Pesticides in the Diets of Infants and Children include Vice Chair Donald Mattison, Michael Gallo, Daniel Krewski, and NRC principal staff scientist Richard Thomas.

The report concludes that current methods for regulating pesticides, which are based on adult eating patterns, underestimate the amount ingested by children. Infants and young children have a less diverse diet and consume much more of certain foods per unit of body weight, and children may be more sensitive to certain toxic substances than adults, the report said.

The report's recommendations include improving toxicity testing to evaluate the sensitivities of children, expanding the use of additional uncertainty factors in regulating reference dose, conducting food consumption surveys for children at seven age levels, standardizing analytical methods and reporting procedures, increasing risk assessment studies, and, when estimating the risk of cancer, developing new methods to account for changes in exposure and susceptibility that occur as a person matures.

A copy of the National Research Council's report "Pesticides in the Diets of Infants and Children" is available from the National Academy Press for \$51.95 by calling (800) 624-6242 or (202) 334-3313.

For information on the SRA workshop, contact Sue Burk, SRA Secretariat's Office, telephone (703) 790-1745, fax (703) 790-9063.

Carnegie Report Urges Reform of Risk Regulation

After three years of deliberations by a task force, the Carnegie Commission on Science, Technology, and Government released its report "Risk and the Environment: Improving Regulatory Decision Making" in June.

In the 150-page report, the Carnegie Commission presents a comprehensive vision of a more effective and efficient regulatory system that would improve decision making within the current regime of environmental and risk-related laws.

The chair of the report's task force was Helene Kaplan of Skadden, Arps, Slate, Meagher & Flom, and the chair of the task force's regulatory subgroup was former EPA administrator Douglas Costle. Contributors to the report include SRA President Jim Wilson, SRA Councilor Donald Barnes, SRA Distinguished Achievement Award recipient Sheila Jasanoff, and SRA members Adam Finkel, Fred Hoerger, Peter Hutt, and Arthur Upton.

The principal staff writers of the report are Jonathan Bender, Christina Halvorson, and Mark Schaefer, who has since joined President Clinton's Executive Office staff as assistant director for the environment in the Office of Science and Technology Policy.

Following is an excerpt from the report, including the commission's 13 findings and recommendations:

This report provides a menu of ideas for renovating the federal government's infrastructure for environmental and risk-related regulation — regulation done by the U.S. Environmental Protection Agency, the Food

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This newsletter is printed on recycled paper.

SRA Expands Annual Meeting

The Society for Risk Analysis will present a record eight topic areas at its 1993 Annual Meeting on December 6-9 in Savannah, Georgia. The topic areas and the names of the people helping organize them and their telephone numbers are as follows:

- *Dose-Response Assessment*, Bob Hetes, (919) 541-5995, and Annie Jarabek, (919) 541-4847
- *Ecological Risk Assessment*, Larry Barnhouse, (615) 574-7393
- *Engineering*, Stanley Levinson, (804) 385-2768
- *Exposure Assessment*, Bob Fares, (703) 642-6863
- *Global and Environmental Risk*, Justin Lancaster, (617) 432-3330
- *Regulatory Policy and Decision Making*, Deborah Amaral, (919) 966-6691
- *Risk Characterization*, Bob Hetes, (919) 541-5995
- *Risk Communication*, Virginia Sublet, (513) 321-6704.

Authors have submitted nearly 300 abstracts to annual meeting organizers, said Bob Hetes, who is co-chair of the SRA Technical Program Committee along with Deborah Amaral and Annie Jarabek. "The quality of the abstracts was very good, but given the large number of abstracts received, not all of them could be accepted."

Awards Opened

This year for the first time the Society is introducing awards for the best poster presentation and for best student papers, both of which will be based on scientific rigor, creativity, and the advancement of risk assessment. The SRA member who receives the poster award will receive acknowledgment with an inscribed plaque and an announcement in the newsletter. Award-winning students will receive \$500 each to defray travel expenses to the annual meeting.

16 Special Sessions Planned

The annual meeting program includes 16 special sessions this year: determining the impact of hazardous waste sites on human health; electro-

In Search of the Perfect Poster

At last year's annual meeting, the poster sessions generated both positive and negative comments from attendees, who raised concerns about the structure of the poster sessions and about the format of individual posters.

"Poster sessions have a place at SRA meetings, but ensuring their success requires limiting posters to material appropriate for this format, enforcing guidance to poster design rules, and structuring the sessions for maximum value," commented SRA member Russell Malcolm, who is the technical program coordinator for biomarkers at the U.S. Environmental Protection Agency's Office of Research and Development.

Malcolm pointed to the Society of Toxicology's structure of poster sessions as a good example. "Posters devoted to a single topic are grouped in one room and viewed for a specified period of time, and the presenters are on hand for informal discussions. Then that is followed by a discussion session, with viewers and presenters convening under the direction of a session chairperson."

To help SRA members as they prepare for this year's annual meeting, RISK newsletter has put together a list of top 10 tips for poster presenters from various sources, including Alan Singleton's book "Poster Sessions: A Guide to Their Use at Meetings and Conferences," published by Elsevier International Bulletins in Oxford, England.

1. Clearly label the poster's sequence. Clearly label the sequence of text and graphics on your poster, using numbers or arrows. "Remember that the viewer may have just come from a poster arranged entirely differently," Singleton writes. Keep the poster simple and clear, even if the topic is complex.

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magnetic field risks (includes two sessions: risk communication and regulatory policy); EPA risk communication roundtable; fundamental aspects of risk assessment; gender differences in risk assessment; geostatistics (tentative); global and environmental health; low dose effects estimated by epidemiological v. extrapolation methods (tentative); low dose modeling for noncarcinogens (tentative); probabilistic methods in risk assessment; risk assessment methods for microbial contaminants in food and water; risk management in coastal and estuarine systems; successes and failures in siting noxious facilities; use of biological markers in exposure-dose-response assessment; and worth of science.

Workshop Planned

As it did last year, SRA also will host a special workshop on the Friday preceding the annual meeting. This year's workshop on December 3 is titled

"Methodologies for Comparative Risk Assessment." The workshop's seven-member panel will cover the quantitative and scientific rigor needed to evaluate different types of risks and risk trade-offs. The tentative program includes topics such as comparing risks from chemical substitution, chemical v. biological, chemical v. radiological, and cancer v. noncancer risks.

"Attendees should note that this workshop is not about the comparative risk efforts conducted by state and local governments, which attempt to rank overall existing environmental risks," Hetes said. "Rather it will focus on the quantitative methods used to evaluate risk trade-offs."

Risk Management Group to Meet

For those interested in forming a risk management specialty group, the technical program committee has scheduled a meeting at 5:30 p.m. Monday, December 6.

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Nominations for 1993 SRA Elections Announced

The SRA Nominating Committee, chaired by former society president Curtis C. Travis, has announced the 1993 nominations for president-elect, secretary, and three councilors. The president-elect serves for one year in that office, with the primary duty of chairing the Annual Meeting Committee, followed by a second year as president of the society. The secretary serves a two-year term, and each council member serves for three years. Society members will receive ballots in the mail.

President-Elect: Paté-Cornell vs. St. Hilaire

M. Elisabeth Paté-Cornell is professor of industrial engineering and engineering management at Stanford University in California. She received an engineering degree in computer science at the Institut Polytechnique de Grenoble, France, in 1972 and a Ph.D. in engineering-economic systems at Stanford in 1978.

Paté-Cornell specializes in risk analysis, engineering reliability, engineering and environmental risk management, engineering economy, and decision analysis. Her recent work focuses on the organizational and managerial aspects of systems safety with applications to the management of jacket-type offshore platforms and the heat shield of the space shuttle. For her work on the space shuttle, she was recently a finalist of the Edelman Award for Management Science Achievement.

Paté-Cornell has been a member of SRA since 1981 and was elected to the SRA Council in 1984. She was the president of the Northern California Chapter of SRA in 1988.

Catherine St. Hilaire is director of regulatory affairs at Hershey Foods Corporation. Her expertise is in the areas of cancer research, toxicological evaluations, health risk assessments, and regulatory analysis. In 1971 she received a B.S. degree *magna cum laude* in biological sciences from West Virginia University. She received a Ph.D. in virology/cancer biology from Pennsylvania State University in 1977.

St. Hilaire has also served at a staff office of the National Academy of Sciences where she worked on a number of reports, including *Risk Assessment in the Federal Government: Managing the Process*.

St. Hilaire joined SRA in 1985, served on the SRA Council in 1988-91, and chaired the Chapter Liaison and Relations Committee for two years. She also was co-founder of an ongoing series of seminars on risk assessment issues held at the Brookings Institution and cosponsored by SRA.

Secretary: Flamm vs. McCallum

W. Gary Flamm is president of Flamm Associates, a consulting firm specializing in toxicology and food and drug regulations. His prior career in the U.S. Public Health Service spanned 25 years at the National Institutes of Health and the Food and Drug Administration, and he has been called upon many times to testify before the U.S. Congress on the safety of substances in the food supply. He has been recognized by both professional societies and government for his accomplishments in establishing a better understanding between government and industry in areas of safety evaluation. Flamm serves on the editorial board of *Risk Analysis*, is a founding member of SRA, and was elected to the SRA Council in 1987.

David B. McCallum is deputy director of the Center for Risk Communication at Columbia University and director of its Washington, D.C., program. McCallum developed and directed the Program on Risk Communication at Georgetown University Medical Center before joining the Columbia center. He was formerly a senior analyst in the U.S. Congress Office of Technology Assessment and has served in many government and private agency posts examining technology assessment and transfer, risk communication, disease prevention, and public health. McCallum was elected to the SRA Council in 1991, served as chair of the Conferences and Workshops Committee for two years, and reviews articles for *Risk Analysis*.

Councilor: Morioka vs. Uchiyama

Toru Morioka is a professor in the Department of Environmental Engineering at Osaka University in Japan. He specializes in risk problems of urban, ecological, water, and waste treatment systems. Following the Tsukuba Workshop of 1984, Morioka organized the second Japan-United States Joint Workshop on Risk Analysis in 1987. He has been an officer of SRA-Japan since it was founded.

Iwao Uchiyama is the director of the Department of Industrial Health at the Ministry of Health and Welfare Institute of Public Health. He has been active in introducing the risk cost-benefit analysis to the regulatory decision-making processes. Uchiyama has organized several symposia on air pollution and toxic chemicals sponsored by SRA-Japan and has been an officer of the Japan Section since 1991.

Councilor: Haimes vs. Orvis

Yacov Y. Haimes is the Lawrence R. Quarles Professor of Systems Engineering and Civil Engineering and founding director of the Center for Risk Management of Engineering Systems at the University of Virginia in Charlottesville. He is a former congressional science fellow and has served on the staff of the Executive Office of the President and on the U.S. House of Representatives Science and Technology Committee. A charter member of SRA, Haimes has chaired the Committee on Conferences and Workshops, is an associate editor of *Risk Analysis*, and is a fellow of SRA.

Douglas D. Orvis is principal consultant and vice president of Accident Prevention Group in San Diego, California. He has more than 30 years of experience in safety, reliability, and risk analysis of nuclear power plants, waste repositories, and other hazardous systems. His recent areas of concentration are human reliability analysis and organizational factors. Applying personal insights gained from measuring reliability of control room operators and assessing importance of various influence factors, Orvis has developed an

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Carnegie Report

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and Drug Administration, the Occupational Safety and Health Administration, and the Consumer Product Safety Commission. Each of the ideas presented in this report by itself could bring significant improvement if implemented. Taken as a whole, however, the ideas present a uniquely comprehensive and integrative institutional vision for regulation. We believe it is a vision of a more effective and efficient regulatory system.

The report frankly criticizes certain past practices and arrangements, but displays no bias for or against stringent regulation. This is perhaps best exemplified in the report's unfavorable evaluation of regulatory review by the Executive Office of the President as conducted in recent years. The report recommends that case-by-case review be de-emphasized in favor of broad forward-looking guidance by the Executive Office. Such a change would take account of the Executive Office's unique institutional position to examine issues that cut across all federal departments and agencies. It would increase efficiency, allowing a president to obtain greater environmental protection for the same cost as the old system, or less cost for the same amount of environmental protection.

Our report takes the current legal and legislative regime as a given and recommends a series of administrative reforms that will both optimize decision making within the current regime and be adaptable to new ones.

We have attempted to develop recommendations that will improve and streamline the federal decision-making process. We offer not policy advice, but ways in which the federal government can better sort through advice and information to develop and implement sound policy for the 1990s and beyond.

Anticipating Emerging Problems

Expanding responsibilities and increasingly limited resources have compelled agency policy makers to make difficult choices about which risks to regulate first and what standards to set. The need for mechanisms to help policy

makers set priorities has been increasingly felt. Risk assessment has emerged as an increasingly common tool for this purpose. Risk assessments, though often crude and inexact, can be used both to provide a rough estimate of the danger posed by individual substances and to allow relative comparisons of risk levels among different hazards. Such procedures can help policy makers determine the severity of problems and provide guidance on where regulatory priorities should lie.

In considering organizational frameworks and decision-making processes to develop and implement regulatory strategies, it is important to devise a dynamic policy making system that can anticipate and respond to the challenges on the horizon as well as those confronting us today.

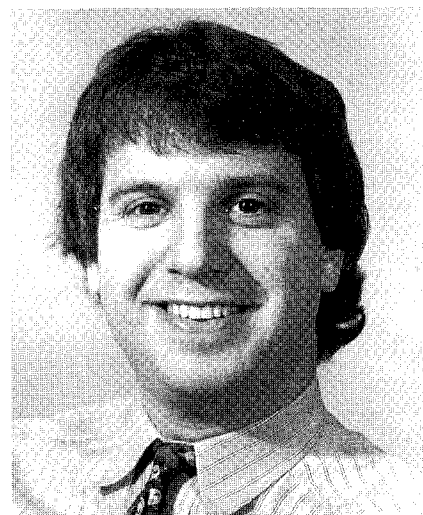
A better capacity to identify potential problems will enable agencies to prevent environmental degradation and minimize health threats before they become more difficult, and thus more expensive, to address. For example, the nation now faces a multibillion-dollar remediation effort to remove lead-based paint from homes and lead pipes and fittings from water systems. Yet the toxicity of lead was recognized long before it became a common component of construction materials.

The problem we face today could have been minimized and serious health effects avoided, and hundreds of millions of dollars could have been saved, had the nation had a science-based regulatory system in place decades ago that could have anticipated this problem and taken steps to prevent it. As is often the case, the costs of past inaction far exceed the costs of prevention.

Process Warrants Concern

The regulation of escalating risks to human and ecological health arising from our ever-growing international economies has become one of the most important emerging roles of government in the past 20 years.

Although U.S. regulatory programs are considered among the strongest in the world, many goals remain unmet. Federal policies addressing environmental, health, and safety threats are



SRA member Adam Finkel prepared the report "Overview of Risk Analysis" for the Carnegie Commission's risk regulation project.

often inconsistent and fragmented. There also is growing concern that our environmental regulatory programs may have placed too much emphasis on cancer-related risks (carcinogens in particular), and too little on non-cancer-related health risks, ecological risks, and the sustainable use of resources.

The process of policy making in this area warrants as much concern as the policies made. Many regulatory practices and arrangements appear ill-suited to coherent policy development and implementation. Priorities tend to be driven by crises rather than proactive deliberation. Regulatory agencies sometimes duplicate each other's efforts, or worse still, work at cross-purposes with each other. Conversely, some important problems do not fall squarely within existing agency jurisdictions.

Though progress has been made in the federal government's decision-making process for environmental, health, and safety regulation, much remains to be accomplished. This report explores some of these decision-making processes and recommends a series of reforms in them. We believe that, if implemented, these recommendations will result in a more efficient, flexible, and forward-looking decision-making infrastructure, one better suited to meeting the challenges of the end of this century and the beginning of the next.

Findings and Recommendations

Broaden the President's Role.

The Executive Office of the President should expand its capacity to formulate broad environmental and risk-related policies and should better integrate these policies with other national goals.

As the only entity in the federal government with a view of the whole regulatory landscape, the Executive Office of the President is a logical focus for regulatory reform efforts. In recent years, unnecessarily high tension has existed between White House staff and agency regulators. The Executive Office has been accused of trying to micromanage technical details of rules that experts in regulatory agencies have prepared. Since the early 1970s, environmental and risk-related policy making in the Executive Office has been largely reactive. Policy activities in the White House have mainly focused on the economic impact of regulatory actions, and the Executive Office has developed relatively few forward-looking initiatives to control threats to public health and the environment.

Of paramount importance is the Executive Office's capacity to identify and analyze issues of presidential significance; to develop integrated policies consistent with statutory mandates; to communicate these policies to responsible agencies, states, the public, and industry; and to monitor policy implementation. In developing environmental and risk-reduction policies, the Executive Office should rely on the analytical capabilities of departments and agencies whenever possible. It should help the president to define the broad contours of the administration's environmental and risk-related policy, but must take care to leave implementation details and day-to-day regulatory decisions to the regulatory agencies.

Rely on Agency Interpretations.

Executive Office reviews of regulatory decisions made by presidentially appointed administrators of federal agencies should consist primarily of examinations of the extent to which decisions are consistent with statutory mandates and broad administration policies.

Help Congress, the White House, and Judges Communicate.

Mechanisms should be devised to promote informal communication among the branches of government — members of Congress, executive branch officials, and judges — with respect to environmental and risk-related issues. Too frequently, interbranch discussions occur only in rigid adversarial contexts such as hearings.

Promote Consistency in Federal Regulations. Mechanisms are needed to improve consistency in federal regulatory decision making and to facilitate interagency cooperation. One approach to meeting these needs is to establish a Regulatory Coordinating Committee comprised of the administrators of the environmental and risk-related regulatory agencies and representatives of the Executive Office of the President.

The environmental and risk-related agencies have mandates that overlap in some areas and leave gaps in others. This committee should develop a coordinated federal response to high-priority cross-cutting problems and set common risk reduction goals and strategies across agencies for these problems. It should also develop methodologies and guidelines for risk assessment and management and promote the exchange of information among regulatory agencies.

Rank Risks in Broad Categories.

Agencies should place problems in broad risk categories and develop strategies to address risks of high priority. To do this, each regulatory agency addressing environmental and risk-related issues should develop a broad-based risk inventory. The agencies should use the inventories' output to help develop multidimensional risk rankings. The agencies should experiment with methods to integrate societal values into relative risk analyses where statutes do not supply all the value judgments necessary to rank risks. Agencies should repeat relative risk analysis initiatives periodically, readjusting the process at each iteration in light of lessons learned, new information, and progress in addressing high-priority risks.

Setting priorities is the fundamental problem in regulatory decision making at all levels. We see relative risk analysis as a promising way to promote

scientifically sound decision making about risk. Nevertheless, we recognize that the technique is still in its infancy. To enhance the accuracy and credibility of the process, two components of relative risk analysis must be strengthened: scientific data must be better collected, organized, and evaluated, and more attention must be devoted to integrating societal values into the process.

Improve Agencies' Internal Scientific Capabilities. Regulatory agencies should critically evaluate and take deliberate steps to improve their internal scientific capabilities and their means of integrating scientific and technological considerations into agency decision-making processes. Individuals with both public policy and scientific expertise should be appointed more frequently to senior positions in regulatory agencies.

Rotate Promising Staff. The federal government should use its existing personnel authority to create opportunities for selected individuals to rotate in the early years of their careers through environmental and risk-related regulatory agencies, Congress, the Executive Office of the President, and in some instances administrative offices of the Judiciary.

Regulatory policy results from a dynamic interplay among politics, economics, law, ethics, and the physical and natural sciences. But relatively few scholars or practitioners of regulatory policy have a truly broad view. By providing opportunities for promising staff members to rotate among the branches, the federal government will develop a highly trained and experienced cadre of individuals with a unique perspective that will eventually prove a valuable asset to the regulatory process. The protection accorded by the civil service system would help insulate these individuals from political influence.

Set Long-term Goals and Report Progress in Meeting Them. Regulatory agencies should establish specific long-term research and regulatory objectives and regularly report their progress toward achieving these goals to the president and Congress. Congress and the President should mandate

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that regulatory agencies justify annual budget and program plans in the context of explicit long-term regulatory goals. Furthermore, Congress should work more closely with federal and state regulatory officials and experts in nongovernmental organizations to devise realistic regulatory goals and deadlines for meeting them.

Congress and the agencies have traditionally been reactive rather than proactive in addressing environmental, health, and safety risks. We encourage Congress and the president to take a longer-range view in devising broad policy mandates and to give regulatory agencies more freedom to conduct internal strategic planning exercises.

Strengthen Link Between Research and Policy Decisions. Regulatory agencies should enhance their long-range planning capabilities by strengthening the linkages between research and regulatory policy-making efforts and by undertaking policy planning exercises in the context of relative risk analyses.

Reduce Rule-Making Ossification. Regulatory agencies should experiment actively with the variety of

means available under existing authority to reduce rule-making ossification. Care should be taken with all experiments to preserve adequate opportunities for analysis and public participation.

Regulatory agencies should create a menu of procedures, ranging from highly simple to more complex, calling for various degrees of public participation and comment, which may be subject to varying degrees of judicial review, and whose legal status may also vary. Agencies could choose the kind of procedure they believe best fits the type of policy problem at hand from among the menu's options.

Inform Congress of Court Interpretations. Mechanisms should be explored to keep appropriate congressional committees informed of the interpretation made and ambiguities found by courts in the statutes that authorize rule making.

Ensure Early Communication Between Executive Office and Agencies. Executive Office officials should communicate less formally, earlier, and more directly with agency officials. The current process — agencies submitting rules to the Executive Office, followed by an Executive Office review for com-

pliance with presidential policies — can create an adversarial relationship between the agencies and the White House, sometimes resulting in delay. Increased informal consultation and discussion earlier in the rule-making process would prove beneficial and would likely lead to faster approval of more effective regulations.

Bolster Ties with Private Organizations. The extensive capabilities of nongovernmental organizations should be used more frequently to evaluate the regulatory process, suggest ways to improve existing regulatory strategies, and aid federal agencies in establishing regulatory priorities. Nongovernmental policy research organizations should establish stronger ties with scientists and engineers in universities to bolster their capacities to examine environmental and health risks issues.

Editor's note: Copies of the report "Risk and the Environment: Improving Regulatory Decision Making" are available for free by faxing or mailing a request to the Carnegie Commission, 437 Madison Avenue, 27th Floor, New York, NY 10022, fax (212) 754-4073, e-mail carnegie@acfl.nyu.edu.

For more information about the report, contact Jonathan Bender, telephone (212) 207-6336.

Industrial Risk Course Held in Moscow

Nearly 50 scientists and specialists from Russia, Austria, Great Britain, China, and Finland attended a seminar on industrial risk analysis in Moscow in February, reports SRA member Vitaly Eremenko.

Titled "Organization, Methods, and Means for Analysis of Regional Safety," the training course was organized by the Moscow International Centre of Educational Systems (ICES) and SRA-Europe.

Such courses are critical for Russia because "the development of the required scientific means and tools for environmental risk assessment and management has only just been initiated in Russia," Eremenko stated in a report to RISK newsletter. "This problem is particularly urgent for this country because of its serious environmental problems."

Leading specialists who made presentations at the seminar include D. J. Clifton, former manager of the Project Department of AEA Technology; A. Gheorghie, the United Nation's project secretariat; Eremenko, who is with ICES and is a member of the SRA-Europe Executive Committee; Jan Holmberg of the Research Centre, Finland; and V. Gubanov, the chairman of the Emergency Committee of the Russian Ministry of Atomic Energy.

The seminar's topics included the experiences of organizations in carrying out risk analysis of Russian industrial areas; risk management for large industrial complexes and energy systems; and safety management.

For more information, contact Vitaly Eremenko by telephone at (095) 196-9579, by fax (095) 924-6852, or e-mail lmi@lmis.kiae.su.

SRA-Japan Holds 6th Annual Meeting

"Informed Consent and Risk Communication" is the theme of SRA-Japan's Sixth Annual Meeting and Symposium, which will be held on November 25-26 at the offices of Yasuda Maritime & Fires Insurance Ltd. in Shin-Juku, Tokyo.

Three sessions are planned on risk communication and decision making, risk management and insurance, and environmental audit.

For more information, contact Deputy President Saburo Ikeda, Institute of Socio-Economic Planning, University of Tsukuba, Tsukuba, Ibaraki 305, Japan, telephone (298) 53-5380, fax (298) 55-3849.

Harvard Risk Center Scrutinizes Risk Bill

As a bill requiring the U.S. Environmental Protection Agency to rank risks slowly makes its way through Congress, researchers at Harvard University hope to impact its final version.

The university's Center for Risk Analysis, which SRA Councilor John Graham directs, is preparing a report for Sen. Daniel Patrick Moynihan on the Environmental Risk Reduction Act. Sen. Moynihan, D-NY, whom many consider to be the strongest supporter of risk analysis in Congress, introduced the legislation as Senate Bill 2132 in November 1991 (see *RISK newsletter*, Second Quarter 1992, p. 17).

"We support the bill. We are happy Congress is talking about risk. But we have several recommendations, which are going to take the form of a letter to Sen. Moynihan," said Harvard research specialist March Sadowitz.

The bill, which is still in committee, would require the EPA to engage in periodic ranking of risks to help set priorities for environmental protection and would support new research programs in environmental economics and risk assessment. Proposed funding for the research programs is \$310 million over six years.

Specifically, the bill would create two 15-member committees within EPA's Science Advisory Board, which is an independent panel that reviews EPA work. Both committees would create reports for the EPA administrator.

The task of the first, the Committee on Relative Risks, would be to identify and rank the greatest environmental risks to human health, welfare, and ecological resources. The second, the Committee on Environmental Benefits, would be charged with estimating the monetary value that the committee deems appropriate for goals such as avoiding premature mortality, cancer, and disease; sustaining biological diversity; and safeguarding ecosystems.

Within two years after the enactment of the bill, the EPA administrator must submit a report to Congress that

includes a prioritized list of risks, the public awareness of each risk, and recommendations on ways to reduce the risks. Congress would then use the report, which would be updated every two years, to direct EPA activities.

"If Congress passed the bill as it is, we would be happy because it is a step in the right direction. But we have three areas of concern," Sadowitz said, noting that the center was still finalizing its report to Sen. Moynihan at presstime.

"First, we wish the bill gave the committees more structure. It is an immense task to rank all these risks," she said. The center recommends that the bill's language include a specific framework for the committees' tasks.

"We suggest a framework that would divide these areas into sectors that relate to how people live — transportation, energy use, food production. This addresses the problem of how do you rank the risk of energy use against the use of pesticides, for example."

The center's second recommendation is that the bill specify that both committees use the same framework. "If the committees use different frameworks, then ranking and benefits would not be on the same scale. But if the ranking and the benefits are made using the same framework, then the results would be more useful," she said.

The third recommendation is that the bill's section on benefits specifically request cost estimates. "It would be a stronger bill if it required a report on how much a benefit will cost as well as how many lives it will save," Sadowitz said.

The center's last suggestion is that the bill require the ranking of the relative promise of risk-reduction opportunities. "The burning of fossil fuels to generate electric power contributes to risks such as air pollution," Sadowitz explained. "The risks of the best alternative sources, such as solar power, need to be compared to fossil fuels. Once comparisons are made, Congress may wish to promote those that promise the smaller degree of risk to society."

Risk Communication Group Members Report on Activities

The accomplishments of several members of SRA's Risk Communication Specialty Group are highlighted in a report to RISK newsletter by Kelly Sund of the Health and Environmental Sciences Group Ltd. in Washington, D.C.

As chair of the Scientific Advisory Group on cellular telephones, **George Carlo** of the Health and Environmental Sciences Group Ltd. held a press conference in June 1993 on the results of research into the questionable link between cellular phones and brain cancer or other health effects.

Linnea Wahl reports that Risk Communication Committee members of the Los Alamos National Laboratory will present a paper at the the Institute of Electrical and Electronics Engineers' International Professional Communication

Conference in Philadelphia during October 1993 on their genesis and educational work.

Ortwin Renn has been named director of Germany's Center for Technology Assessment (similar to the U.S. Office of Technology Assessment but apolitical) and professor of sociology at the State University of Stuttgart in Germany.

Branden Johnson of the New Jersey Department of Environmental Protection and Energy authored recent risk communication articles including "The Mental Model Meets the Planning Process: Wrestling with Risk Communication Research and Practice" (*Risk Analysis*, 1993) and "Coping with Paradoxes of Risk Communication: Observations and Suggestions" (*Risk Analysis*, 1993).

Risk Center in Stockholm Expands Research

The Center for Risk Research, which is part of the Economic Research Institute in Stockholm, Sweden, continues to expand its research projects as it celebrates its fifth anniversary. Established in 1988, the center's main purpose is to carry out behavioral and social research in the field of risk.

The center first began operations when SRA member Lennart Sjöberg accepted the position of professor of psychology at the institute's Stockholm School of Economics, specializing in risk research. Sjöberg now heads the department of economic psychology at the school and oversees a group of up to 10 people working with the center. The major part of the center's work is financed by grants for specified projects by research councils or other external organizations, and the number of employees varies with the number of graduate students involved.

From the center's inception, public concern about environmental and technological risks has been an important research topic. Previous involvement in studies on perception of ionizing radiation — concerning both nuclear power plants in Sweden and the Chernobyl accident in the former Soviet Union — and on public attitudes and perceptions in the handling and storage of nuclear wastes initially contributed to the creation of the center.

The center's areas of research now are broader, involving various risks related to the environment, industries, technologies, and lifestyles. Topics studied include perceptions of risks at work, consumers' perceptions of risks, decision making concerning credit and loan applications, and cultural comparisons. The center communicates current ideas and research findings in the fields of risk perception, risk attitudes, and risk communication to a wide audience by organizing seminars and conferences and offering education courses.

Among the topics that the center's researchers are investigating or studying is a project with researchers at the Academy of Science in Warsaw, which includes comparisons of perceptions of risks related to industry wastes in Poland and Sweden. Both organizations hope to expand this project to involve researchers from other states around the Baltic Sea and to focus on risk perceptions that are related to economic differences between the countries. Other cultural studies include comparing risk perceptions between people in Sweden and Brazil.

The center also continues to conduct studies related to radiation, including skin cancer from sun radiation, nuclear wastes, and the social and psychological effects of the Chernobyl accident as part of a European Community project called The Joint Study Project2.

In February 1993, the center co-sponsored a conference on social amplification of risk with the Center for Safety Research at the Royal Institute of Technology in Stockholm. Speakers included SRA members Ortwin Renn, who is director of Germany's Center for Technology Assessment and



SRA members Britt-Marie Drottz-Sjöberg (left) and Lennart Sjöberg conduct research at the Center for Risk Research in Stockholm.

A Viewpoint from Sweden

The Need for a Social-Psychological Approach to Environmental Problems

Editor's Note: The following is an excerpt from the report "Center for Risk Research: The First Four Years" by SRA member Lennart Sjöberg. Sjöberg is the head of the Center for Risk Research at the Stockholm School of Economics, which is part of the Economic Research Institute in Sweden.

The reason that risks constitute a focal point of interest for many people may simply be that we are biologically tuned to avoid danger. Indeed, it seems that people are more motivated to avoid danger than to achieve pleasure.

The young field of risk research can be traced back to concerns about nuclear power risks in the 1960s. Proponents of nuclear power argued that its risks were quite small, especially when compared to everyday risks. An interest in measuring various types of risks and providing comparative information soon emerged. However, such comparisons did not have

(Continued on page 9.)

professor of sociology at the State University of Stuttgart; Torbjorn Thedeon of the Royal Institute of Technology in Stockholm; and Lennart Sjöberg and Britt-Marie Drottz-Sjöberg of the Center for Risk Research in Stockholm.

For more information, contact the Center for Risk Research, Stockholm School of Economics, Box 6501, S-113 83, Stockholm, Sweden, telephone 46-8 736 95 76, fax 46-8 30 72 25.

Editor's Note: The preceding article is based on a report to RISK newsletter by SRA member Britt-Marie Drottz-Sjöberg, a researcher at the Center for Risk Research in Stockholm, Sweden.

SRA-Europe Establishes Award

An internationally renowned anthropologist, Mary T. Douglas, will receive the first SRA-Europe Distinguished Achievement Award.

The Executive Committee of the Society for Risk Analysis-Europe established the award to honor professionals in Europe who have made outstanding scientific contributions to the field of risk analysis.

Douglas, who was born in Italy and now resides in England, has been chosen to receive the award in recognition of her research on hazard management and on cultural perspectives.

An anthropologist and professor emeritus, Douglas co-authored the book "Risk and Culture: An Essay on the Selection of Technical and Environmental Dangers" in 1982 with Aaron Wildavsky. In 1992, she published "Risk and Blame: Essays in Cultural Theory." The ideas she presented in the first volume are said to have "startled the fields of technological hazard management," and those in her second volume are said to have "offered the communities of risk professionals an un-

SRA-Europe Holds 4th Conference

The Society for Risk Analysis-Europe will hold its fourth annual conference on October 18-20 in Rome, Italy.

SRA President Jim Wilson will represent the Society's Council in the United States at the conference, which is titled "European Technology and Experience in Safety Analysis and Risk Management: 10 Years After the Seveso Directive."

To register for the conference, contact:

Paolo Vestrucci
N.I.E.R.
Via S. Stefano 16
40125 Bologna, Italy
Telephone: 39 51 239 728
Fax: 39 51 227 824

usual but new perspective on their crafts," said Pieter Jan Stallen, former SRA-Europe president.

It has been written that "Professor Douglas' insights are touching ground in the community of risk analysts and regulators trying to come to grips with the hazards of technological development and environmental degradation. Yet her ideas are very practical in a

Europe that has a common market but at the same time is becoming more culturally diverse," Stallen said. Douglas' latest book is "Objects and Objections," published in 1993.

In October, Douglas will speak on "Cultural Perspectives on Risk Perception Research" at the SRA-Europe Conference in Rome, Italy, where she will receive the award.

Viewpoint from Sweden

(Continued from page 8.)

any noticeable effect on risk perceptions. The problems of risk perceptions and attitudes clearly called for further social and behavioral research.

The risks most commonly discussed today are those connected with pollution, but other health and accident risks also exist and can at times attract much local concern. An example is in northern Sweden, where the existence of wolves in rural neighborhoods worries some residents. Environmental activists, who often live in cities, are concerned about the future of this species in our country, sometimes to the point of explicitly valuing the lives of wolves above those of humans.

Hence, dramatic differences in risk perceptions and values exist. Experts in a particular field of technology often regard its risk very differently from lay people. Experts are better informed, but they may have different values. Indeed,

the way a risk is defined — whether as mostly a question of probability or mostly as value — may well have an important effect on how the size of the risk is perceived.

Similarly, risks connected with lifestyles have quite different dynamics as compared to those due to environmental pollution. Even though warned by experts, people often neglect risks due to their own behavior, such as smoking cigarettes or consuming alcohol. By contrast, the public may worry about environmental risks that the experts regard as grossly exaggerated.

At the Center for Risk Research, we contend that individual behavior is a very important facet for understanding many of the environmental problems facing the global community today. Hence, a social-psychological approach is important both for understanding the processes that create environmental problems and for suggesting remedies.

Annual Meeting

(Continued from page 2.)

The organizer of the meeting is SRA member Branden Johnson, telephone (609) 633-2324.

Program Refined

This year the technical program committee is initiating several program changes. This includes extending sessions until 5:30 p.m. on Monday and Tuesday to allow for expanded presentations and prolonged discussions. Also, the annual meeting will end two hours earlier than usual at 3 p.m. on Thursday, December 9. "This is due to the poor attendance of the last session at past meetings, which ended at 5 p.m.," Hetes said.

Posters Enhanced

The committee is also arranging a brief session in which poster authors will present their work and be available for a question and answer period.

Risk-Related Happenings

Call for Papers on Health Hazards of Glycol Ethers

The National Institute for Safety Research of France, the National Institute for Occupational Safety and Health of the United States, and the National Institute of Occupational Health of Sweden are organizing an "International Symposium on Health Hazards of Glycol Ethers" on April 19-21, 1994, at the Premontres Cultural Centre in Nancy-Pont-à-Mousson, which is a 17th century abbey in Eastern France. The purpose of the symposium is to provide a scientific basis for risk assessment and risk management of glycol ethers.

The working languages of the symposium are English and French, with simultaneous translations provided. The scientific program consists of invited lectures, submitted papers, and poster sessions on the topics of occupational and domestic exposure; toxicokinetics, metabolism, and biomonitoring; mechanisms of action; in vitro toxicity; in vivo toxicity; effects on humans (case reports); and risk assessment.

The deadline for submitting abstracts is December 31, 1993. To register, send your name, title, affiliation, mailing address, and telephone, fax, and telex numbers to National Institute for Safety Research, International Symposium on Health Hazards of Glycol Ethers, Avenue de Bourgogne, BP 27 - F 54501 Vandoeuvre Cedex, France, telephone (33) 83 50 20 27, fax (33) 83 50 20 96, telex 850 778 F.

Quick Response Reports Available

The University of Colorado is publishing short research reports pertaining to natural disasters through its Natural Hazards Research and Applications Information Center. The Quick Response Reports are written by researchers who travel to disaster sites immediately after an event to gather information regarding impact, response, and recovery. Following is a sampling of recent releases:

"Report on the Socioeconomic Impact of the Erzincan, Turkey, Earthquake of March 1993" by William A Mitchell. Report No. QR57, \$2.50.

"A Systems View of Emergency Response to Hurricane Andrew" by John C. Pine. Report No. QR58, \$2.00.

"Reconnaissance of South Florida to Assess Damages, Planned Responses, and Future Needs in the Commercial Fisheries Stemming from Hurricane Andrew" by James R. McGoodwin and Christopher L. Dyer. Report No. QR59, \$4.75.

To order a report, write to the Publications Clerk, Natural Hazards Research Center, IBS #6, Campus Box 482, University of Colorado, Boulder, CO 80309-0482, telephone (303) 492-6819, e-mail hazards@vaxf.colorado.edu.

Food Safety Risk Workshop

The Food Forum of the Institute of Medicine's Food and Nutrition Board (FNB) will host a one-day workshop on

"Prioritizing, Managing, and Communicating Food Safety Risks: Dealing with What Bugs Us." Focusing on risk prioritizing, technologies for combating contamination, and effectively communicating food safety risks to the public, the workshop will be held on Tuesday, September 14, at the auditorium of the National Academy of Sciences in Washington, D.C.

SRA member Richard L. Hall, chair of FNB's Food Forum and retired director of science and technology at McCormick and Company, will present the opening remarks of the workshop. Four panel discussions will follow on food hazards; HACCP (Hazard Analysis Critical Control Point) science, process, and uses; case studies of HACCP in practice; and communicating food risks to the public. SRA member Peter Sandman, an independent consultant in Boston, Massachusetts, is one of the panelists.

The last session features government responses to the issues discussed in the panel sessions, with invited speakers from the U.S. Food and Drug Administration, U.S. Department of Agriculture, U.S. Environmental Protection Agency, Federal Trade Commission, National Marine Fisheries Service, and the U.S. House of Representatives Subcommittee on Health and the Environment.

To register, mail or fax your name, title and affiliation, address, and telephone and fax numbers to Geraldine Kennedo, ATTN: Food Forum, Food and Nutrition Board, Institute of Medicine (FO-3039A), 2101 Constitution Avenue, N.W., Washington, D.C. 20418, telephone (202) 334-1917, fax (202) 334-2316.

World Health Reports on Pesticides in the Americas

The Pan American Health Organization has issued a report on pesticides titled *Pesticides and Health in the Americas*, both in English and Spanish. The document summarizes the results of a number of epidemiological and other studies carried out in Latin America and shows that substantial segments of the population have significant exposures to pesticides, frequently involving high percentages of intoxications.

The document suggests elements that should be included in measures that are urgently needed, particularly in Latin America, to protect human health and the environment.

To request a copy of *Pesticides and Health in the Americas*, write the Division of Health and Environment, Attention: Henk de Koning, Pan American Health Organization, 525 23rd Street, N.W., Washington, D.C. 20037.

Hazard Research Writers Sought

Kluwer Academic Publishers has invited authors and editors to submit works for a series of books on advances in natural and technological hazards research. The series, which will be published in English, is aimed at scholars, practitio-

ners, and policy makers concerned with scientific, socioeconomic, and political aspects of hazards. One objective of the series is to provide rapid, refereed publication of works more comprehensive than journal articles. Monographs, handbooks, reference works, and carefully edited conference proceedings are appropriate. If interested, contact the book series editor M.I. El-Sagh, Departement d'Océanographie, Université du Québec à Rimouski, Rimouski, Québec, Canada G5L 3A1, telephone (418) 724-1707.

International Symposium on Power Generation

The symposium "Power Generation Choices: An International Perspective on Costs, Risks, and Externalities" will be held on September 23-24, 1993, at the J.W. Marriott Hotel in Washington, D.C. The Organization for Economic Cooperation Development Nuclear Energy Agency and the Oak Ridge National Laboratory have organized the symposium, in cooperation with the American Nuclear Society, Canadian Nuclear Association, Central Research Institute of Electric Power Industry, European Nuclear Society, and International Atomic Energy Agency.

A reception and a poster session will be held on the evening of September 22 at the time of registration. Persons

interested in presenting poster papers should contact Pierre Girouard in Issy les Moulineaux, France, telephone 33 1 45 24 10 65, fax 33 1 45 24 11 10.

For more information or to register for the symposium, contact R.B. Shelton, NEA/ORNL Symposium on Power Generation, Energy Division, Oak Ridge National Laboratory, P.O. Box 2008, Oak Ridge, Tennessee 37831-6187, telephone (615) 576-8176, fax (615) 574-7671.

Food Processors Institute Publishes HACCP Manual

The Food Processors Institute, the not-for-profit education arm of the National Food Processors Association, has published a workshop manual on the Hazard Analysis Critical Control Point (HACCP) system, titled *HACCP: Establishing Hazard Analysis Critical Control Point Programs*. The editor is Kenneth E. Stevenson, senior director of microbiology/regulatory compliance at the association's Western Research Laboratory. The manual describes the HACCP system and provides information and guidance in developing and setting up HACCP programs. The manual's cost is \$45.00, plus shipping. For more information, contact the Food Processors Institute, telephone (202) 393-0890.

Perfect Poster

(Continued from page 2.)

Remember that the poster must first attract viewers before it can inform them.

2. Include graphics. "It is worth going to some lengths to include graphics to break up the text," Singleton writes. "If the subject does not easily lend itself to graphical treatment, it might not be suitable for a poster session at all." Be sure to include a caption under every photograph or graph.

3. Use large lettering. Viewers should be able to read titles easily at a distance of five yards or more and the main text at three yards, Singleton advises. The size of the type used in headlines should be a minimum of 3/4" in height, and the type size of the main text should be a minimum of 3/8" in height. "Standard typewriter size is *not* suitable for poster presentation," Singleton writes. Also, simple but prominent subheadings such as "introduction" or "conclusion" are more effective than longer subheads of three or more words.

4. Prepare display in advance. Mount the text and graphics ahead of time on paste-up boards sized to fit into a briefcase. This protects the material and makes it easier to put up and take down the presentation.

5. Know the display measurements in advance. Before creating your poster, ask the organizers for the precise dimensions of your display area so that you can size your poster accordingly.

6. Have a notepad handy. Whenever you can't be in attendance at your poster presentation at the annual meeting, leave a notepad out near your display. This allows viewers to leave messages or remarks.

7. Wear a badge. All presenters should wear distinctive, color-coded badges so that viewers can easily recognize them. Also, each presenter should have a place to sit or stand without obscuring the poster.

8. Let participants grade the results. During the poster session, meeting organizers can hand out questionnaires to participants, asking them four or five short questions about their impressions of the poster sessions. Specifically, ask viewers if they have any suggestions on ways to improve the poster session.

9. Request poster format. If your research paper includes complex charts and graphs that would be hard to grasp if presented on slides at a platform session, then it may be more suited to a poster format where detailed information can be studied at length. Likewise, poster format might be preferable for a topic that is of interest to a small specialist group. In such cases, request the poster format when submitting your abstract.

10. Don't overlook poster benefits. Don't make the false assumption that posters are considered inferior to papers presented in platform sessions. SRA annual meeting organizers don't decide on the form of presentation for each entry until after all papers have been accepted or rejected. Their resulting decision is based on what they consider to be the optimal presentation format for each submission, not on the quality of the paper.

U.S. Chapter News

Columbia Cascades Plans Reorganization

In order to make attendance at meetings more convenient for members, the Columbia Cascades Chapter is reorganizing into two sections that will hold parallel meetings. Starting this fall, the Columbia section will hold its meetings in Richland, Washington, and the Cascades section will hold its meetings in Seattle, Washington. Plans also call for one joint meeting, sometime in the spring.

A chapter newsletter with specific meeting details will be sent to members in late August or early September. For additional information, contact either James Dukelow, Battelle Pacific Northwest Laboratories, Battelle Boulevard, Richland, WA 99352, telephone (509) 372-4074, e-mail JS_Dukelow@ccmail.pgov; or George Cvetkovich, WISOR Psychology, Western Washington University, Bellingham, WA 98225, telephone (206) 650-3544, e-mail CVET@nessie.cc.wvu.edu.

Michigan Holding Elections

The Michigan Chapter, the youngest of the 14 SRA chapters within the United States, is holding its second election of new officers. The results should be known by the end of August. Rolf Hartung, the chapter's first president-elect, is now completing his term as president.

In January the Michigan Department of Natural Resources hosted a chapter meeting in Lansing. The focus of the papers presented at the meeting was "Risk Analysis Issues and the Superfund Program." Approximately 50 persons attended.

The next chapter meeting is being planned for the fall of 1993. For more information contact Rolf Hartung, Professor of Environmental Toxicology, Department of Environmental & Industrial Health, School of Public Health, the University of Michigan, Ann Arbor, MI 48109-2029. His new fax number is (313) 971-4180.

U.S. Chapter Contacts

- Columbia-Cascades:** Jim Dukelow (president), (509) 376-7074.
East Tennessee: Joe Minarick (president), (615) 481-2117.
Greater Pittsburgh: Vincent Arena (president), (412) 624-3023.
Lone Star: Ben Thomas (president), (713) 520-9900.
Metropolitan: Miriam de Salegui (president), (212) 749-7961.
Michigan: Rolf Hartung (president), (313) 936-0787.
National Capital Area: Rebecca Klemm (secretary), (202) 667-5244.
New England: Alan Eschenroeder (president), (617) 259-0886.
Northern California: Tom McKone (secretary), (510) 422-7535.
Ohio: Mike Dourson (president), (513) 569-7533.
Philadelphia: Eileen Mahoney (president), (215) 242-4388.
Research Triangle: Julie Kimbell (president), (919) 541-2070 (ext. 364).
Rocky Mountain: Ralph Grover (president), (303) 450-0005.
Southern California: Robert Mulvihill (president), (310) 640-1050.

New England Seeking Corporate Sponsors

The New England Chapter is asking for new corporate sponsors, particularly companies involved in risk assessment, to help underwrite the increasing production and mailing costs of the chapter's monthly newsletters and seminar series announcements. Companies who will consider becoming corporate sponsors should contact the chapter's past president, Charles Menzie, telephone (508) 453-4300.

The chapter is trying a new method of notifying members whose memberships have expired. The address labels used in mailing the chapter newsletters and meeting notices will be coded with the date indicating when a member owes the annual membership fee.

The professionally recorded VHS videotapes of the April 7 workshop on "Risk and Uncertainty in Public Policy Decisions," sponsored by the New England Chapter and the Boston Risk Assessment Group, are still available. A mock public hearing on the siting of a municipal solid waste incinerator is

recorded on the first tape, and a panel discussion on the proceedings is recorded on the second. For more information or to order, contact Alan Eschenroeder, Alanova Inc., 76 Todd Pond Road, Lincoln, MA 017731, telephone (617) 259-0886.

After a summer break, the chapter meetings will resume in the fall.

Philadelphia Publishes First Newsletter

The Philadelphia Chapter issued its first chapter newsletter this spring. *PSRA Newsletter*, Vol. 1, No. 1, features a review of the chapter's 1992-93 activities.

The chapter's board of directors is meeting during the summer to plan activities for the chapter beginning in the fall of 1993. The board members include the chapter's president, Eileen Mahoney; president-elect, Michael Jaycock; past president, Isadore Rosenthal; and secretary/treasurer, Robin Streeter.

Second BELLE Conference Held

More than 100 people attended the second annual Biological Effects of Low Level Exposures (BELLE) Conference on April 26-27 in Arlington, Virginia. The conference's goal is to encourage the study of the biological effects of low level exposures of chemical agents and radioactivity.

In opening the conference, BELLE Director Edward Calabrese of the University of Massachusetts emphasized the need to "let the data lead us" without imposing constraints on interpretation.

Speakers Kenneth Schaffner of George Washington University and Leonard Sagan of Electric Power Research Institute presented statements on scientific paradigms. Schaffner discussed the concept of scientific paradigms as developed by Thomas Kuhn in his 1970 book, "The Structure of Scientific Revolutions." Kuhn had suggested that science operates on models that are revised only when contrary information becomes overwhelming and a "scientific revolution" occurs.

Turning to the radiation paradigm, its history, and the assumptions inherent in it, Sagan suggested that the development of this model was influenced by the environmental ethic of the 1950s and 1960s. Many sectors of society (e.g., lawyers, regulators, radiation scientists) have a stake in maintaining the model, even though there is little scientific validation, growing economic cost, and little health benefit.

Three speakers examined the statistical basis for the low dose non-threshold model. Michael Davis, U.S. Environmental Protection Agency, reported a systematic review of a sample of 1,800 articles containing dose-response data culled from the toxicology literature. Applying certain criteria, 147 of these articles were selected for more detailed analysis, with 22 (or 15%) showing evidence of a "U-shaped" dose-response relationship. Davis illustrated some of the conceptual and statistical difficulties in ascertaining the incidence of non-monotonic relationships.

David Gaylor of the National Center for Toxicological Research suggested that there may be an optimal exposure level for all environmental agents. Hormetic responses will only appear, he said, if the optimal dose is greater than the naturally occurring environmental level. If the optimal level is less than the environmental level, then there will be no stimulatory or hormetic effect from increasing exposure levels. Gaylor also reported his own review of some 3,000 animal studies carried out for carcinogenesis. Peter Groer of the University of Tennessee described Bayesian techniques for examining low dose data, searching for "change points" in the data. In both beagle and human data, he demonstrated evidence of such change points.

Four speakers addressed questions of mechanisms, including stimulatory effects at low doses, and whether observations of phenomena at low doses are consistent with the linear paradigm. Harihara Mehendale of Northeast Louisiana State University saw stimulated tissue repair as central to an understanding of the response to a toxic agent. Colin

Hill of the University of Southern California spoke of a class of phenomena becoming known as an "adaptive response." Hill concluded that understanding adaptive responses and their incorporation into risk assessment will only occur when some systematic use of models is adopted. Joan Smith-Sonnenborn, University of Wyoming, focused on the role of stress proteins as pivotal in the adaptive response. Angelo Turturro, National Center for Toxicological Research (NCTR), described the series of NCTR experiments investigating the mechanisms underlying the well-known increase in survival and decrease in carcinogenesis of caloric-restricted animals.

Three epidemiologists presented views on human responses to low doses of chemical agents and radioactivity. Ethel Gilbert, Battelle Pacific Northwest Laboratories, reported on studies of workers exposed to occupational levels of radiation, which will be used to provide an upper bound on risks. Robert Miller, National Cancer Institute, found, from a review of literature, the lowest doses at which effects of radiation have been demonstrated. For example, diagnostic x-ray exposures late in pregnancy have been related to a 1.5-fold excess of childhood leukemia in Great Britain and New England. Ralph Cook, Dow Corning, pointed out that even though cancer has been noted in occupationally exposed human populations working with chemicals, in some cases there is evidence of a protective effect. This was illustrated with data from dioxin-exposed populations.

In another presentation, George Milo of Ohio State University discussed the inconsistencies and consistencies of expressions of biological endpoints.

The conference concluded with a panel of speakers who commented on the proceedings. Panelist John Graham of the Harvard School of Public Health, who is an SRA member, noted that during the two-day conference he had heard several examples of agents which appeared to be inconsistent with the non-threshold paradigm. The examples were alcohol, diet, dioxin, and aspirin, all of which produced paradoxical (and beneficial) effects at low doses. Graham suggested several tactics for achieving a new paradigm, including: 1) be cautious about generalizing from weak data; 2) be open to exceptions to rules and bold in disseminating those exceptions; 3) continue to conduct the mechanistic studies necessary to build a base of knowledge about low dose effects; and 4) be just as tough on observations which appear to prove the rule (e.g., the non-threshold model) as on those which seem to be exceptions to the rule (hormesis).

Other panelists were SRA member Roger McClellan of the Chemical Industry Institute of Toxicology and John Higginson of Georgetown University, who expressed concern about the dogmatic application and misapplication of the non-threshold model.

Editor's Note: This article was based on a report by Leonard Sagan of the Electric Power Research Institute in Palo Alto, California.

Calendar of Events

September 14. WORKSHOP ON PRIORITIZING, MANAGING, AND COMMUNICATING FOOD SAFETY RISKS: DEALING WITH WHAT BUGS US, National Academy of Sciences Auditorium, Washington, D.C. (See "happening" on page 10.)

September 19-24. INTERNATIONAL INVITATIONAL CONFERENCE ON DISASTER MITIGATION & RESPONSE, Puerto Vallarta, Mexico. Contact the International Goodwill Group; Melia Complex, Suite 2005; Paseo de la Marina Sur; Puerto Vallarta, Jalisco; CP 48300 Mexico; telephone (52) 322-1-02-00, ext. 2005; fax (52) 322-1-01-18.

September 26-October 1. 24TH INTERNATIONAL CONGRESS ON OCCUPATIONAL HEALTH, Nice, France. Sponsored by the International Commission on Occupational Health. Contact Yveline Lagarde, C.O. 24 France, "Les Miroirs" Cedex 27, 92096 Paris La Defense, France, telephone 33 (1) 47.62.33.70, fax 33 (1) 47.62.31.53, telex 611 570 F MIROI SG 3 +.

October 18-20. FOURTH ANNUAL CONFERENCE OF SRA-EUROPE, Rome, Italy. Contact Paolo Vestrucci, N.I.E.R., Via S. Stefano 16, 40125 Bologna, Italy, telephone 39.51.239728, fax 39.51.227824.

October 31-November 3. CONFERENCE ON OCCUPATIONAL EXPOSURE DATABASES, Hilton Hotel, McLean, Virginia. Contact the Conference on Occupational Exposure Databases, 6500 Glenway Avenue, Building D-7, Cincinnati, OH 45211, telephone (513) 661-7881.

November 1-4. FIRST ANNUAL HEALTH EFFECTS RESEARCH LABORATORY SYMPOSIUM - BIOLOGICAL MECHANISMS AND QUANTITATIVE RISK ASSESSMENT, Research Triangle Park, NC. (See ad on page 15.)

November 25-26. SIXTH ANNUAL MEETING AND SYMPOSIUM OF SRA-JAPAN, Tokyo, Japan. Contact SRA-Japan Secretariat, Prof. Saburo Ikeda, Institute of Socio-Economic Planning, University of Tsukuba, Tsukuba, Ibaraki 305, Japan, telephone (298) 53-5380, fax (298) 55-3849.

December 5-8. SRA ANNUAL MEETING, Savannah, Georgia (see article on page 2). Contact SRA Secretariat, 8000 Westpark Drive, Suite 130, McLean, VA 22102, telephone (703) 790-1745, fax (703) 790-9063.

March 20-24, 1994. PSAM-II - INTERNATIONAL CONFERENCE ON SYSTEM-BASED METHODS FOR THE DESIGN AND OPERATION OF TECHNOLOGICAL SYSTEMS AND PROCESSES, San Diego, California. Contact Professor George Apostolakis, Mechanical, Aerospace, and Nuclear Engineering

Dept., 38-137 Engineering IV, University of California, Los Angeles, CA 90024-1597, telephone (310) 825-1300, fax (310) 206-2302.

March 21-24, 1994. EXPLORISK '94 - FIRST INTERNATIONAL EXHIBITION ON EXPLOSION PROTECTION AND RELATED RISK CONTROL, Gent, Belgium. Contact R. Deschoolmeester, Manager, EuropEx Events N.V., Heiveldekens 8, B-2550 Kontich, Belgium, telephone (32) (03) 458.29.48, fax (32) (03) 458.29.02, telex (46) 35507 b.

April 10-12, 1994. FOURTH SYMPOSIUM ON ENVIRONMENTAL TOXICOLOGY AND RISK ASSESSMENT: TRANSBOUNDARY ISSUES IN POLLUTION—AIR, SURFACE, AND GROUNDWATER, Montreal, Quebec, Canada. Sponsored by the American Society for Testing and Materials (ASTM) Committee E-47 on Biological Effects and Environmental Fate and held in conjunction with the committee's standards development meetings, April 12-14. Deadline for submitting a title, abstract, and paper submittal form is August 31, 1993. To obtain a form or ask questions, contact Dorothy Savini, Symposia Operations, ASTM, 1916 Race Street, Philadelphia, PA 19103-1187, telephone (215) 299-2617. More information is available from the symposium chairman, Thomas W. La Point, Clemson University, P.O. Box 709, Pendleton, SC 29670, telephone (803) 646-2237, fax (803) 646-2277, e-mail LAT@CLEMSON.CLEMSON.EDU.

July 10-14, 1994. FIFTH U.S. NATIONAL CONFERENCE ON EARTHQUAKE ENGINEERING, Chicago, Illinois. For conference information, contact Earthquake Engineering Research Institute, 499 14th Street, Suite 320, Oakland, CA 94612-1902, telephone (510) 451-0905, fax (510) 451-5411. For technical program information, contact Claudia Cook, Newmark Civil Engineering Laboratory, University of Illinois, 205 N. Mathews, Urbana, IL 61801-2397, telephone (217) 333-0498.

August 20-26, 1994. FRONTIERS OF STATISTICAL ECOLOGY AND ECOLOGICAL STATISTICS, Sixth International Congress of Ecology, Manchester, United Kingdom. For information, contact G.P. Patil, Center for Statistical Ecology and Environmental Statistics, Department of Statistics, Pennsylvania State University, University Park, Pennsylvania 16802, telephone (814) 865-9442, fax (814) 863-7114, e-mail GPP@PSUVM.bitnet.

July 2-6, 1995. VII INTERNATIONAL CONGRESS OF TOXICOLOGY - HORIZONS IN TOXICOLOGY: PREPARING FOR THE 21ST CENTURY, Seattle, Washington. Contact ICT VII, c/o Society of Toxicology, 1101 14th Street, NW, Suite 1100, Washington, D.C. 20005-5601, telephone (202) 371-1393, fax (202) 371-1090.

Risk Courses

September 20-21. HAZOP STUDY METHODOLOGY, Joe C. Thompson Conference Center, the University of Texas at Austin. For questions on course content, contact C. Dale Zinn, telephone (512) 258-2451. For registration information, contact Continuing Engineering Studies, the University of Texas at Austin, College of Engineering, ECJ 10.324, Austin, TX 78712, telephone (512) 471-3506.

September 22-24. HAZARD ASSESSMENT AND RISK ANALYSIS TECHNIQUES FOR PROCESS INDUSTRIES, Joe C. Thomp-

son Conference Center, the University of Texas at Austin. For contacts see September 20 listing.

October 21. OCCUPATIONAL AND ENVIRONMENTAL LEAD EXPOSURE, Northwest Center for Occupational Health and Safety, Seattle, Washington. Contact Jan Schwert, Northwest Center for Occupational Health and Safety, Department of Environmental Health, SC-34, University of Washington, Seattle, WA 98195, telephone (206) 543-1069.

Advertisements

BIOLOGICAL MECHANISMS AND QUANTITATIVE RISK ASSESSMENT

The Health Effects Research Laboratory of the U.S. Environmental Protection Agency is pleased to announce that its first annual symposium will be held November 1-4, 1993, at the Sheraton Imperial Hotel & Convention Center in the Research Triangle Park, North Carolina. The Symposium will focus on the role of biological-mechanisms research in future risk assessment strategies. The role of mathematical models of biological systems in integrating research activities and reducing uncertainties in the risk assessment process will be discussed. An opportunity will be provided for presenting posters on topics related to the theme of the Symposium. For more information on the Symposium or for submission of abstracts, please contact:

HERL Symposium Coordinator
Research and Evaluation Associates, Inc.
100 Europa Drive, Suite 590
Chapel Hill, North Carolina 27514
(919) 968-4961
(919) 967-4098 (FAX)



Environmental Toxicologist

The Oregon Department of Environmental Quality (DEQ) in Portland is a dynamic state agency committed to protecting the environment of Oregon. We are seeking high-quality, self-motivated professionals for future Environmental Toxicologist openings.

The Environmental Toxicologists serve as the agency's specialists on environmental hazards of toxic substances and are responsible for preparing or critically reviewing risk assessments of human health or environmental effects of toxic substances in the environment. The toxicologists may also serve on special assignments for projects within the agency or cross-agency.

These positions require the equivalent to a master's degree in toxicology, or a closely related field, and four years of experience as a toxicologist in an environmental program. In addition to the monthly salary of \$2,950 to \$3,932, the State of Oregon offers a substantial benefits package to employees including medical, dental and life insurance; paid vacation, sick leave and holidays; contribution to a retirement plan; and a deferred compensation plan.

If you would like to be considered for placement on the list of eligible candidates, please leave a message on the DEQ job recording line at (503) 229-5785 to request an application and detailed announcement. Deadline for receipt of application materials for inclusion on the eligible list is 5 p.m. September 30, 1993.

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Manager Risk Assessment and Toxicology San Francisco Bay Area

For nearly a quarter of a century, ENSR has been providing industry and commerce with innovative solutions for a broad range of environmental problems. With over a thousand professionals nationwide, we have grown to become one of the leading environmental companies in the nation.

This position will assume leadership of the risk assessment and toxicology business area, work with clients to acquire new business and assure satisfactory completion of projects, and direct and mentor junior staff, as well as provide services in own technical specialty (e.g. toxicology, exposure assessment, environmental chemistry) to clients both inside the company (e.g. other business units such as air quality or hazardous waste) and outside (petroleum companies, chemical companies, electric utilities, universities, trade associations).

A doctoral degree in a relevant discipline (e.g. toxicology, biology, biostatistics, environmental studies, environmental chemistry) with 10+ years experience with at least 5 years in risk assessment or toxicology consulting and excellent ability to analyze risk issues quantitatively as well as qualitatively with strong understanding of client's needs is required.

Knowledge of California and western states regulatory risk assessment procedures is preferred; and experience in multimedia risk assessments, strong written and oral communication skills with proven leadership in presentation/training skills, and regional reputation as a contributor with ability to attract business through own capabilities and some record of publication is required.

ENSR offers a highly competitive compensation and benefits package, including flex spending for medical and dependent care, 401(k) and pension plan, plus dental and vision care. For consideration, send resumes to ENSR Consulting & Engineering, Job DM/Human Resources, 1320 Harbor Bay Parkway #210, Alameda, CA 94502.

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Member News

Paul Chrostowski and **Sarah Foster**, formerly of ICF Kaiser Engineers, have joined the Weinberg Consulting Group Inc., 1220 Nineteenth Street, N.W., Suite 300, Washington, D.C. 20036-2400, phone (202) 833-8077.

Paul A. Croce of the Factory Mutual Research Corporation in Norwood, Massachusetts, has been named a fellow of the American Society of Mechanical Engineers.

Glenn W. Suter II of the Oak Ridge National Laboratory in Oak Ridge, Tennessee, is the principal author of the book *Ecological Risk Assessment* (1993; Lewis Publishers).



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Note: Contributions to the newsletter should be faxed to (615) 927-8379 or (615) 688-9888 (Res.) or mailed to:

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Nominations

(Continued from page 3.)

integral model of organizational influences on plant risk. Orvis joined SRA in 1988, was the technical program chair for the 1992 SRA Annual Meeting in San Diego, and has served two years as secretary of SRA's Southern California Chapter. He is also the associate general chair for PSAM-II.

Councilor: Amaral vs. Chess

Deborah Amaral is assistant professor in environmental sciences and engineering in the School of Public Health at the University of North Carolina at Chapel Hill. Amaral, who received her Ph.D. in engineering and public policy from Carnegie Mellon University, was awarded the American Chemical Society Congressional Fellowship in 1983-84, with which she served as a legislative assistant in the office of Senator Max Baucus of Montana. Amaral formerly was a management consultant with Decision Focus Inc. in Los Altos, California, and has performed analyses of environmental and health risks for industry and government clients. She is one of three co-chairs of the 1993 SRA Technical Program Committee, which is charged with organizing the annual meeting, and is a former president of the SRA Research Triangle Area Chapter.

Caron Chess is director of Rutgers University's Center for Environmental Communication. She serves on the National Academy of Sciences Board on Radioactive Waste Management. Chess co-authored *Improving Dialogue with Communities: A Risk Communication Manual for Government*, which is used widely. Prior to moving to academia, she coordinated implementation of New Jersey's right-to-know law for the New Jersey Department of Environmental Protection after leading development of the country's first right-to-know law. She currently is serving on the SRA Awards Committee, is active in the Risk Communication Specialty Group, and was a coordinator for the program of the 1989 SRA Annual Meeting.

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