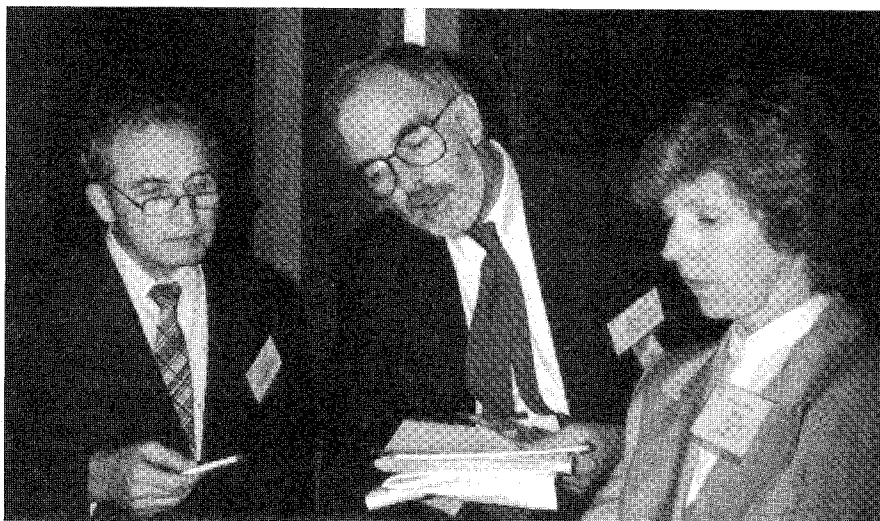


RISK *newsletter*

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First Quarter 1993



Vitaly Eremenko (from Moscow), Warner North, and Sue Burk at SRA Meeting.

Two Fellows Named: North, Hohenemser

The Society's immediate past president and an internationally recognized researcher from Massachusetts were named fellows of the Society for Risk Analysis at the 1992 Annual Meeting in San Diego. The 12 other 1992 fellows, whose profiles appeared in the Fourth Quarter 1992 issue of *RISK newsletter*, were also honored at the meeting.

1992 SRA president D. Warner North of Decision Focus Inc. in Mountain View, California, and physics professor Christoph Hohenemser of Clark University in Worcester, Massachusetts, bring the total number of SRA fellows to 24.

As president, North personally helped the Society fulfill one of the main goals he outlined when he took office at the end of the 1991 annual meeting. At that time, he called for SRA to be an activist organization around the globe. "Many of the types of problems that we are concerned with are problems all over the world," he told the Society at the start of his term. "Let us provide help based on our experience and let us work with colleagues in other countries."

During his presidency, North traveled widely to help foster the Society's growth. In November, he was the keynote speaker at SRA-Japan's annual conference in Kyoto, and he has encouraged the Society to hold its 1995 annual meeting jointly with SRA-Japan in Hawaii. North also traveled to Russia and Ukraine to meet with

(Continued on page 16.)

Kiev Chapter Is First In Eastern Europe

Keeping pace with the world's dramatic political changes, the Society for Risk Analysis approved its first chapter in Eastern Europe at the 1992 Annual Meeting in San Diego.

There to represent the Kiev SRA Chapter in Ukraine was Naum Borodianskii, a key local organizer.

Borodianskii said that the chapter's hope is to introduce the science of risk analysis to universities so that it can be used to help solve his country's formidable problems.

"Our concern is the safety and health of the Ukraine nation. The number of deaths in the Ukraine is greater than the number of births," he said during an interview at the annual meeting.

Borodianskii, who also attended the 1991 SRA Annual Meeting in Balti-

more, said that the Jewish Ukrainian University and Taras Shevchenko, the Kiev state university, have already decided to include risk analysis in their curriculums. The U.S. Environmental Protection Agency is playing a key role by helping Ukrainians develop an educational center on risk analysis problems, added Borodianskii, who is with the V. Glushkov Institute of Cybernetics of the Academy of Sciences of Ukraine. "Only with international cooperation will we solve the great problems in the fields of environment, health, economy, and law in Ukraine and Russia."

The Kiev Chapter is formally part of SRA-Europe.

SRA International Coordinator Vlasta Molak, who last traveled to East-

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This newsletter is printed on recycled paper.

Call for Nominations for SRA Awards

The SRA Awards Committee invites nominations for the two categories of awards presented by the Society. One category is the Outstanding Service Award, which is awarded to SRA members for extraordinary service to the Society. The other category is the Distinguished Achievement Award, which is awarded to any person for extraordinary achievement in science or public policy relating to risk analysis.

Please submit the names of nominees and a brief paragraph supporting each by April 30, 1993, to a member of the Awards Committee:

B. John Garrick, Chairman
President
PLG Inc.
Suite 400, 4590 MacArthur Blvd.
Newport Beach, CA 92660-2027
Telephone: (714) 833-2020
Fax: (714) 833-2085

Caron Chess
Director, Environmental Communication
Research Program
Rutgers University, Cook College
P.O. Box 231
New Brunswick, NJ 08903-0231
Telephone: (908) 932-8795
Fax: (908) 932-7815

Chris G. Whipple
Vice President
ICF/Kaiser Engineers
Environmental Group, 7th Floor
1800 Harrison Street
Oakland, CA 94612-3430
Telephone: (510) 419-5516
Fax: (510) 419-5355

Eastern Europe

(Continued from page 1.)

ern Europe in October, said that several other chapters are forming in the region.

"In all of the places I visited during my trip — Hungary, Poland, Croatia, Russia — I met with people who want to form SRA chapters in their cities," said Molak, who heads Gaia Unlimited Inc. in Cincinnati, Ohio. "We should encourage this wonderful potential to develop."

In addition to Borodianskii, Eastern Europeans from Russia, Croatia, the Czech Republic, and the Slovak Republic also attended the annual meeting.

Croatia Cites Needs

In Zagreb, Croatia, where approximately one-fourth of the nation's population resides, more than 70 scientists, professors, and researchers are interested in forming an SRA chapter, said Branimir Molak, a consultant in Zagreb. The disciplines represented by the chapter include many branches of the fields of medicine, engineering, the basic sciences, sociology, and fire protection. The members are from both academia and industry.

"SRA chapters would help locals form rational ways to deal with their problems," Vlasta Molak said. "The

issues are different in countries like Croatia. They don't have time to worry about minute residuals of chemicals in food. The question is whether there is going to be enough food or heat for survival."

One problem that Croatia continues to face is civil war.

"The Serbian army has been very near," said Ante Lauc, who teaches in bombed classrooms at the University of Osijek. "At times we have struggled every day to have water, bread, electricity, telephone."

Russia to Use Risk Analysis

Russia also needs international assistance to help encourage government agencies to use risk analysis, said Vitaly A. Eremenko, one of three attendees from Moscow. Eremenko, an



Alexander Protsenko (left) and Igor Kuz'min of Moscow attended the SRA Annual Meeting.

SRA-Europe councilor and director and professor at the International Centre of Educational Systems, presented a videotape on the Chernobyl nuclear accident and a session paper at the annual meeting. His colleagues attending the annual meeting were Igor I. Kuz'min, a professor at the Kurchatov Institute, and Alexander N. Protsenko, a professor with the USSR Academy of Sciences, who also presented papers at the annual meeting.

The Society could help fledgling chapters in Eastern Europe with both scientific and financial support, Vlasta Molak said during a luncheon at the annual meeting.

"Most people in this room make between \$1,000 and \$7,000 a month. People in Eastern Europe make between \$100 and \$300 a month, and in the former Soviet Union they make between \$10 and \$20 a month.

"If they had to pay \$1,000 for a plane ticket to come here to this meeting, it would take them 100 months."

Immediate past president Warner North, who traveled abroad in 1992 on behalf of SRA, added: "I was struck by the same contrast when I had breakfast in a hotel in Tokyo for an amount of money that was equal to the monthly income of my host when I stayed in Moscow. I hope we will provide what assistance we can to Eastern Europe."

Founder Elected President-Elect

One of the founders of the Society for Risk Analysis, Robert G. Tardiff, was elected president-elect for 1993. Also elected were three SRA councilors, Vicki M. Bier of the University of Wisconsin, Thomas A. Burke of the Johns Hopkins University, and Ray Kemp of the London-based Dames and Moore.

As one of his main goals, President-elect Tardiff hopes to improve risk communication.

"It is almost a duty for anyone who is a scientist or engineer to be able to communicate their findings to people who aren't in their particular area of expertise," said Tardiff, who is vice president of health sciences at EA Engineering, Science, & Technology Inc. in Silver Spring, Maryland.

He especially would like for the Society to set up a surveillance system that would monitor the risk analysis needs of federal and state agencies and Congress.

"Now that the Society is recognized as the clear dominant force in risk analysis, we have a real opportunity to convince people who are high-level decision makers to use science to the most powerful extent," he said. "We need a surveillance system that would tell us very quickly who is in need of strong, technical information. We then could take the initiative of introducing ourselves as ones who can help them, in an impartial manner, to understand the use of science in decision making.

"We want to advocate the best use of science, no matter what the outcome might be."

Tardiff, who is an internationally recognized expert in toxicology and risk assessment, will also spearhead the organization of the 1993 SRA Annual Meeting.

He formerly was chief of the U.S. Environmental Protection Agency's Toxicological Assessment Branch and was executive director of the National Academy of Sciences/National Research Council Board on Toxicology and Environmental Health Hazards. He has 25 years experience directing and



Robert G. Tardiff

conducting risk assessments and developing risk assessment methodologies. Tardiff holds a Ph.D. in pharmacology and toxicology from the University of Chicago and a B.A. degree in biology from Merrimack College.

New Councilors

Bier, Burke, and Kemp, who replace R.A. (Tony) Cox, Peter Barton Hutt, and Roger E. Kasperson on the SRA Council, will each serve three-year terms.

Vicki M. Bier is an assistant professor at the University of Wisconsin's Department of Nuclear Engineering in Madison. She has a joint appointment in the Department of Industrial Engineering. In 1989, she was selected for the National Science Foundation Visiting Professorship for Women at the University of Maryland's Chemical and Nuclear Engineering Department.

She formerly was with Pickard, Lowe and Garrick Inc., where she conducted Bayesian data analysis in support of nuclear power plant risk assessments. Bier has also served as a consultant for Arthur D. Little Inc.'s Risk Analysis Unit, where she participated in several risk analyses of chemical and petrochemical facilities.

Bier's research interests include risk analysis, decision analysis, and operations research. She has a Ph.D. in

operations research from the Massachusetts Institute of Technology and a B.S. degree in mathematical science from Stanford University.

Thomas A. Burke is an assistant professor at the Johns Hopkins University's Department of Health Policy and Management in Baltimore, Maryland. He has a joint appointment in the Department of Environmental Health Sciences.

Prior to his appointment at Johns Hopkins, Burke was deputy commissioner of health for the State of New Jersey. He served as the scientific coordinator for many of the state's major health-related investigations, including evaluating toxic contaminants in drinking water and dioxin contamination from industrial sources.

He is a member of the National Academy of Sciences Panel on Separations Technology and Transmutation Systems. Burke received his Ph.D. in epidemiology from the University of Pennsylvania, his master's degree from the University of Texas, and his bachelor of science degree from Saint Peter's College.

Ray Kemp is a principal environmental planner with the Environmental Management Group of Dames and Moore, which is based in London, England. He leads the company's work on hazard assessment, risk communication, and environmental impact assessment.

As a councilor, Kemp said he is "particularly keen to find ways of encouraging young scholars in the field of risk assessment to join the Society."

Before joining Dames and Moore, Kemp was the first post-doctoral researcher at the University of East Anglia's Environmental Risk Assessment Unit. He was also the coordinator of the university's World Health Organization Collaborating Centre for Environmental Health Risk Assessment and Communication.

He received his doctorate in planning and the nuclear industry at the University of Wales.

Report from 1992 SRA Annual Business Meeting

Holding the Society for Risk Analysis' business meeting during a luncheon, rather than in the late afternoon as had been done in the past, resulted in a record attendance in 1992. About 400 members were present at the December 8 meeting, which was more than triple the number of people who attended the 1991 business meeting.

At the business meeting, SRA's incoming President Jim Wilson announced that a total of 589 people were attending the SRA 1992 Annual Meeting. Of these, 159 were new members and 43 were students.

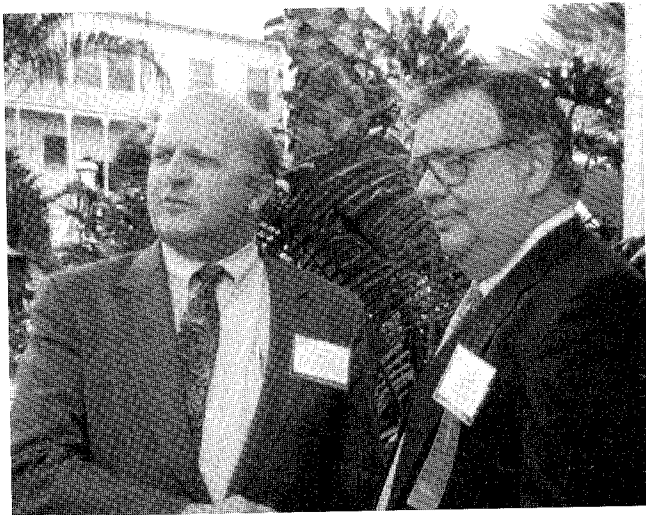
Upcoming Meetings

Wilson also announced that the 1993 SRA Annual Meeting will be held on the waterfront of Savannah, Georgia, December 5-8. In 1994, the meeting is scheduled in Baltimore, Maryland.

In 1995 a joint annual meeting with SRA-Japan is planned in Honolulu, Hawaii. "I see the Hawaii meeting as an opportunity for participation from the Pacific Rim countries," said outgoing SRA president Warner North.

Dues Raised

At the business meeting, North announced that the Society's 14-member Council had unanimously raised annual dues from \$60 to \$75.



SRA's 1992 Program Chairman Doug Orvis and 1993 President Jim Wilson.

"We haven't had a dues increase in two years," North said. "My theory of why this is very much in our interest to support is that the dues enable us to provide better services to you, the membership."

The dues increase will allow the Society to publish its journal six times a year, instead of quarterly. The membership fees also pay for the RISK newsletter and for support services that the Secretariat's Office provides.

Finance Update

On the recommendation of Treasurer Raymond Boykin, the Council also set a goal of having a reserve balance in the bank that is two times annual expenses, or about \$550,000. At the time of the 1992 business meeting, the Society had a cash balance of \$85,000.

"Most professional societies like to maintain a reserve balance at somewhere around two times their annual expenses," Boykin said. "Of course, we're not going to reach \$550,000 overnight. The plan is to have the dues pick up a greater portion of the operating costs, to do more fund raising through gifts and grants, and to possibly get corporate sponsorship for specific activities. We hope that by the turn of the century we can have a reserve of a magnitude of around \$400,000."

"It is very important for us to have a financial basis as we plan future activities," North added. "As we consider holding a future annual meeting in Hawaii with the Japan section, frankly, we risk not getting a high attendance and therefore having a financial loss. This makes having reserves very, very important."

In 1992, the Society's revenues

are expected to be \$250,000 and expenses \$240,000, according to Boykin. In 1991, revenues were \$344,000 and expenses were \$336,000. The Society's proposed budget for 1993 estimates that revenues will be \$315,000 and expenses will be \$283,000.

To further help SRA's finances, the publishing contract with Plenum Press for the Risk Analysis journal was renegotiated in the Society's favor, Boykin said.

Elections, Membership

SRA Secretary Vlasta Molak reported the results of the Society's 1992 elections. "The winners are Robert Tardiff as president-elect and Vicki Bier, Thomas Burke, and Ray Kemp as councilors." (See page 3 for story.) Molak also reported that the Society had 1,896 members in December 1992, up 38 over last year. (Note: As of February 1993, the Society has approximately 2,150 members.)

Scope Broadening

Molak, who is also SRA International Coordinator, announced at the business meeting that the Society had approved a chapter in Kiev, Ukraine, which is the first official SRA chapter in Eastern Europe. (See page 1 for story.) Other chapters in the region are also in the process of forming, including ones in Croatia, the Czech Republic, and Russia. (See pages 1 and 13 for story.)

U.S. Chapters

SRA Councilor Rae Zimmerman reported that at a chapter breakfast meeting, delegates from the Society's U.S. chapters discussed streamlining procedures in areas such as accounting and membership records. "We see the chapters as having an essential role in the Society," Zimmerman said. "They are holding workshops and events that would interest many people throughout the country." (See page 22 for story.)

Organizer Recognized

Doug Orvis of Accident Prevention Group, who did much of the ground-

Call for Nominations for SRA Officers

The SRA Nominating Committee solicits nominations for the following offices in the Society's 1993 elections:

President-Elect
Secretary
Three Councilors

The secretary will serve a two-year term and, according to the bylaws, may be elected for a second consecutive term. Secretary Vlasta Molak will complete her second consecutive term this year.

Councilors will serve three-year terms and may not succeed themselves until one year has elapsed following the completion of their terms. Councilors Ann Fisher and David McCallum will complete their terms in 1993. Saburo Ikeda is the third councilor whose term will end this year, and SRA-Japan will nominate the candidates for his position.

Please submit nominations with a brief paragraph supporting each by April 30, 1993, to:

Curtis C. Travis
Oak Ridge National Laboratory
P.O. Box 2008, Bldg. 4500S
Oak Ridge, Tennessee 37831-6109
Telephone (615) 576-2109, fax (615) 574-9887

work in organizing the annual meeting, was recognized for his many hours of work and in turn praised those who had assisted him. "I'd like to thank Jim Wilson, who was the focal point, each of the specialty group chair people, and the session chairs," Orvis said.

President-elect Robert Tardiff is charged with orchestrating the 1993 SRA Annual Meeting.

Staff Thanked

Outgoing president North also thanked the staff of the Secretariat's Office in McLean, Virginia; the RISK newsletter staff in Knoxville, Tennessee; and *Risk Analysis* editor Curtis Travis in Oak Ridge, Tennessee, for their work.

SRA Journal

Due to the growing number of submissions it receives — more than 200 papers a year — SRA's journal *Risk Analysis* is increasing publication from four to six times a year.

"The number of submissions keeps increasing, and our publisher, Plenum Press, is always asking me to cut some article out of an issue," Travis said. "By going to six issues a year, we basically will be able to accept 50 percent more papers."

The journal is also in need of more reviewers, he said. "If anyone would

like to help with the process of reviewing papers, drop me a note telling me what area you're interested in reviewing, and I will start sending papers to you. We need to expand our list of reviewers in all countries, not just the United States." The editor's mailing address is Curtis C. Travis, Health & Safety Research Division, Oak Ridge National Laboratory, P.O. Box 2008 MS6109 Building 4500S, Oak Ridge, TN 37831-6109.

Travis also called for researchers in countries outside the United States to submit more articles.

Changing of the Guard

Before turning his post over to 1993 President Jim Wilson at the end of the business meeting, North remarked on the growth of the Society and its importance as a forum for diverse viewpoints in risk analysis.

SRA members at the business meeting praised North for his year of service as president, commenting particularly on his international work that included traveling to Japan and Eastern Europe.

Wilson presented to North an inscribed plaque and a certificate, which named him a Fellow of the Society. "This is a small token of our esteem, attesting to the contribution you have

made to the Society this year," Wilson said.

As president, Wilson plans to tackle SRA's structure. "The structure of the Society is a problem of abundance and success, not one of weakness," he said. "As the European and Japanese sections have grown, it's been clear that the way we were set up originally is not appropriate for the governance on an international organization with as many members abroad as we have. Tony Cox of SRA-Europe, Saburo Ikeda of SRA-Japan, and I will act as points of contact with the three organizations.

"We expect to have something for your consideration at next year's annual meeting so that it can be discussed in 1994 and perhaps adopted into the bylaws."

In closing, Wilson commented on the importance of the Society's diversity.

"The strength of the Society is in its interdisciplinary role. It brings together people from philosophers to physicists who might not otherwise talk to each other. This gives us a unique role to provide expertise to the governments of our country and other countries that are becoming more conscious of the role that risk analysis can play in routine public policy decisions," Wilson said.

Setting National Environmental Priorities: The EPA Risk-Based Paradigm and Its Alternatives

Three alternative paradigms for setting environmental priorities were compared with the risk-based approach favored by the U.S. Environmental Protection Agency at a national conference held November 16-17 in Annapolis, Maryland. The Center for Risk Management at Resources for the Future in Washington, D.C., organized the conference, which was attended by approximately 100 invitees from various interested groups. According to Adam Finkel of CRM, the conference accomplished its goal of providing a forum for advocates of various risk-reduction methods and allowing controversial questions to be posed about each. Given below is RISK newsletter's summary of Finkel's report on the conference to the plenary session of the 1992 SRA Annual Meeting.

The first day of the conference began with EPA Deputy Administrator Henry Habicht II giving a history of the agency's comparative risk assessment (CRA) process, which was codified in the EPA's 1990 Science Advisory Board report, "Reducing Risk: Setting Priorities and Strategies for Environmental Protection." The premise of CRA is that environmental priorities should be based on expert scientific opinion regarding the greatest and/or most cost-effective opportunities for reducing risks.

Habicht pointed out that EPA does not intend to pursue "hard" version of the CRA process, and, in any case, all risk-based priorities influence less than 10% of the agency budget. But Jonathan Lash of the Vermont Law School, who cochaired the SAB report, said that hard versions *are* advocated within both the EPA and the Office of Management and Budget and also in U.S. Sen. Daniel Moynihan's bill.* He believes CRA projects should integrate science with values and democracy, as is done at state and local levels.

Risk ranking imposes a "Sophie's choice," said Mary O'Brien, an environmentalist and University of Montana professor. She urged EPA to involve all society sectors in seeking and proposing alternatives to environmentally damaging activities, rather than looking strictly at large risks or large risk reduction activities.

Concerns About CRA

Several other concerns about the use of CRA were voiced in a series of three point-counterpoint discussions. Dale Hattis and Rob Goble of Clark University in Worcester, Massachusetts, said EPA could improve CRA by solv-

ing some of the problems of uncertainty and "apple and orange" comparisons, and by developing a "figure of merit," with social costs and benefits in the numerator and a "unit of limiting agency resources" in the denominator. Granger Morgan of Carnegie Mellon University in Pittsburgh agreed that CRA can be much improved, particularly by assessing multiple attributes of risk, and that members of the public should be integral players within the analysis. But while these problems are being worked on, he added, he knows of no nonquantitative way to set priorities.

Donald Hornstein of the University of North Carolina at Chapel Hill talked about both the hard and soft versions of CRA being vulnerable to pressure from special interests. He said that, ironically, a "dispassionate debate" could result from rationalizing the process, which might rob it of its broad public support. Richard Belzer of the

Office of Management and Budget argued that the hard version is not morally inferior, given the scarcity of resources and the effects of regulation on the poor. The alternatives, he added, might well replace the scientific elite with another elite group.

Victoria Tschinkel, now with Landers and Parsons in Tallahassee, Florida, and formerly the secretary of the Florida Department of Environmental Regulation, talked about the pitfalls for state agencies of the top-down approach of priority setting. What states need most from the EPA, she said, are data and expertise. Tracy Mehan, EPA Associate Deputy Administrator and former director of the Missouri Department of Natural Resources, said that obstacles at the state level are themselves major arguments for risk-based priority setting—it will help marshal the needed resources and expertise.

Alternative Paradigms

Before the alternative paradigms were presented on the second day of the conference, speakers pointed out that the phrase "risk-based priority setting" really has two meanings: (1) priority setting *for* risk reduction (the goal); and (2) priority setting *by* risk reduction (the means). EPA apparently favors both meanings, while Barry Commoner, one of the presenters of an alternative paradigm, questions both of them. Nicholas Ashford, another presenter, favors the first meaning and questions the second one.

As the first presenter, Commoner, director of the Center for the Biology of Natural Systems at Queens College, argued for a "prevention paradigm." He said that in implementing environmental protection, society must choose

Hard vs. Soft Versions of Risk-Based Priority Setting

In a hard version of CRA, experts calculate estimates of the aggregate risk to populations or ecosystems posed by various environmental problems, and then calculate the estimated marginal cost of reducing each risk by various technological or other controls. Priorities would then be set by allocating resources, preferably to those interventions that had the lowest cost per unit of risk reduction.

In a soft version, experts and the public would engage in dialogue to try to converge on risk rankings that reflect the magnitude of possible risk reductions and other salient properties of the risks (e.g., voluntariness, distributional equity).

a means to improve the environment (either pollution control or pollution prevention) and then a strategy to set priorities (either expert judgment based on risk assessment or broad public judgment). He believes that CRA is a logical strategy for setting priorities for pollution control, but he claims that control has been a "failed national enterprise" during the last 20 years. Moreover, CRA cannot possibly help decide whether the massive changes in jobs, wealth, and society brought about by prevention would compound or counterveil the environmental benefits. Only public judgment can do that.

John Graham of the Harvard School of Public Health countered that prevention and CRA are complementary, not at odds, and that without some CRA, society would indeed be rudderless. He said the prevention paradigm may be too costly and risky and even preclude other benefits. He added that any prediction of an "economic renaissance" fueled by applying the prevention paradigm was essentially a judgment call that might rest on a shakier foundation than the CRA method Comonomer was criticizing.

Robert Bullard of the University of California at Riverside promoted an "environmental justice paradigm," stating that environmental protection is not a privilege but a right. He feels that CRA institutionalizes unequal protection because the important risk numbers frequently are not visible to the public eye and, in any case, pitfalls exist in the calculations of the numbers themselves. Furthermore, he stressed, CRA is not needed (or even designed) to recognize geographic hot spots where minorities and the poor face multiple risks from multiple sources.

Albert Nichols of National Economic Research Associates Inc. in Cambridge, Massachusetts, argued that making environmental protection a right would be counterproductive for minorities and the poor, as no priorities would be set at all. He feels that unequal protection is the legacy of the *status quo ante*; that is, it is due to practices before CRA began to be emphasized. He added that the costs of environmental protection are probably regressive and must be carefully considered.

Nicholas Ashford of the Massachusetts Institute of Technology championed a "solution-based paradigm," saying that planners should prioritize desired solutions to environmental problems rather than the problems themselves. When properly designed, regulation can trigger technological innovation, with greater risk reduction at less cost. His preferred approach is to use some risk assessment but for regulators to determine which industries are most likely to innovate, or are most in need of innovation, and then for planners to make innovation at those industries their highest priorities.

Responding, Jim Wilson of the Monsanto Co. in St. Louis, Missouri, said Ashford's method was highly technocratic at a time when consensus is moving away from the top-down approach. Moreover, how could EPA know "who's ripe for technology forcing" if the industries themselves don't know, he asked.

Conclusions

At the end of the two days, several emerging themes had become apparent: (1) Risk reduction must be construed more broadly than as life-saving

and ecosystem improvement to include other values that the public regards as important. (2) In addition to risk reduction, various other goals deserve some weight (such as public access and empowerment, promoting innovation, and redressing environmental injustice). (3) In addition to the pollution-control method, other methods deserve some consideration (such as prevention and geographic targeting). (4) Future priority-setting efforts need to pay greater attention to state and local concerns and processes.

Finally, the conferees agreed to disagree, adjourning with the following questions still outstanding: Are the four paradigms mutually exclusive? Will EPA take a hard or a soft approach? What approaches are states and localities taking? Will EPA's approach divert resources from problem solving? Will broad-scale prevention lower or raise risks? Will minorities and the poor do better under CRA or not? Should national risk ranking be used only for its "shock value," or for really trying to set priorities based on aggregate effects? Should ranking be based on benefit per cost or net benefit per unit of agency resource? Should expert judgment, public judgment, or neither be the trump card? Should judgment about the size of problems prevail over prevention/innovation/justice? Can or should public preferences change?

*The Environmental Risk Reduction Act (S.110, originally S.2132); see RISK newsletter, Fourth Quarter 1992, p. 13.

For further information on this conference, contact Adam Finkel, Center for Risk Management, Resources for the Future, 1616 P Street NW, Washington, D.C., 20036, telephone (202) 328-5110.

National Academy of Sciences Names New President

The National Academy of Sciences has elected noted biochemist Bruce M. Alberts as its 20th president. Alberts will assume his post at the Washington, D.C.-based academy on July 1 of this year.

A member of the Academy since 1981, Alberts is a molecular biologist at the University of California in San Francisco. He is well-known as the lead

author for the widely used biology textbook *The Molecular Biology of the Cell*.

Alberts, who earned his bachelor's and doctoral degrees from Harvard College and University, respectively, said he is committed to improving science education. He has been involved in education projects such as the City Science program for elementary students in San Francisco.

Currently, he is chair of the National Research Council's Commission on Life Sciences.

Alberts will replace Frank Press, who is completing his second six-year term as president — the maximum allowed by the academy's bylaws. A geophysicist, Press was science adviser to President Jimmy Carter and is co-author of the textbook *Earth*.

Recommendations Emerge from Workshop on Carcinogen Risk Assessment

Under a cooperative agreement with the U.S. Environmental Protection Agency and the California Environmental Protection Agency, the Society for Risk Analysis held a workshop on the Friday preceding the SRA Annual Meeting in December to examine three issues in cancer risk assessment: (1) improvement of risk characterization, (2) use of meta-analysis, and (3) use of biological data in qualitative and quantitative risk assessments. One of the participants, David B. McCallum, Deputy Director of Columbia University's Center for Risk Communication in Washington, D.C., gave a preliminary report on the workshop at the plenary session of the annual meeting. Subsequently RISK newsletter received the following summary of a report on the workshop prepared by the Drafting Subcommittee of the Workshop's Organizing/Advisory Committee. In addition to McCallum, members of the Drafting Subcommittee are Elizabeth Anderson, Clement International Corporation; Paul F. Deisler Jr., retired from Shell Oil Company; Catherine St. Hilaire, Hershey Foods Corporation; Hugh L. Spitzer, ILSI-Risk Science Institute; Harlee Strauss, H. Strauss Associates Inc.; James D. Wilson, Monsanto Company; and Rae Zimmerman, New York University.

The SRA Organizing/Advisory Committee for the Workshop on Key Issues in Carcinogen Risk Assessment Guidelines recruited panels of experts to consider each issue and present their views. The workshop did not seek a consensus from the panelists; therefore, the recommendations from the Drafting Subcommittee reflect the views and opinions of the Subcommittee and not all the workshop participants. Those recommendations (in abbreviated form) are as follows:

1. Begin the risk assessment process by identifying what information the risk manager needs to make a risk management decision and to help others understand that decision. The risk analyst should consult with the risk manager prior to, or as the first step of, the assessment in order to understand the risk decision that must ultimately be made and to better determine what information will be needed to inform that decision and to inform the subsequent risk communication process.

2. Consider mechanism-of-action information early in the hazard evaluation. Most scientists agree that information on the potential mechanism of the compound of interest can have an important influence on the risk assessment and that available data should be evaluated early in the risk assessment process so that any important mechanistic data can inform all stages of the risk assessment process.

3. Draw conclusions only during the risk characterization stage; use the hazard identification, dose-response assessment, and exposure as-

essment for evaluation only. The various steps in the risk assessment process form an integrated whole. Premature summaries can inhibit the interactive assessment necessary for characterization and distort the results. The risk analyst should wait until the risk characterization step to reduce information and combine evidence from all analytic steps into an integrated summary.

4. The risk assessment should include a best estimate based on the totality of the available data and the uncertainty in the data quality. This estimate should describe the likelihood that different values within the range of uncertainty represent measurable effects. Focusing on the "worst case" can blur the distinction between risk assessment and risk management. A "best" estimate considers all the data and data uncertainties and provides a distribution of scientifically plausible values.

5. Make uncertainty explicit in every stage of the risk assessment process. When mathematical models are used to evaluate biological data, they usually include simplifying assumptions that limit the applicability of calculations to those regimes in which the assumptions are valid. Risk analysts must make sure that these simplifications and their implications are well understood by risk managers.

6. Develop a technique to make transparent the aggregated expert judgments that influence the risk assessment and the overall degree of confidence in the assessment. Expert

judgment is essential to interpret data and assess their integrity and applicability, and often the judgment of several experts must be aggregated. At the workshop, the risk characterization panelists presented a conceptual process for better organizing risk assessments and explaining their results both internally and externally. In this approach—called the "degree of certainty" tree—each analysis or finding is characterized by the degree of confidence expert scientists have in that finding, along with the criteria or rationale for that judgment. The degree of confidence is transformed into weights applied to each of these elements in a logical scheme connecting them. Applying the techniques of decision analysis to such a logical scheme results in a display of the *strength of the analysts' conviction* that a particular answer from this tree is the most scientifically appropriate one.

7. Carcinogens should be classified during the risk characterization stage using a new classification system with a small number of clearly defined terms. Classification should be part of risk characterization (instead of hazard identification), and it should reflect *all* the relevant information in the risk assessment. A new classification system is needed that focuses on likely effects in humans rather than the source of information used in the analysis. To avoid confusion, the new system should be different from the existing system and should have a clearly defined vocabulary that is not subject to ambiguity or misinterpretation.

8. The risk characterization should include a concise narrative that clearly describes, in qualitative terms, the expected harm to humans at likely human exposures. Risk communication to help the public understand the risks associated with the substance of concern is very important. A qualitative, narrative statement should be used when communicating with the public because numbers are open to misinterpretation and tend to confer more legitimacy than may be justified.

9. More extensive use should be made of appropriately conducted meta-analyses of human data for risk assessment. Meta-analyses can enhance the utility of human data. Advantages of using meta-analyses include the guarantee that all suitable available data are employed and the potential exists for identifying patterns not detectable in individual studies. However, meta-analyses can result in inaccurate conclusions if they are not properly conducted. A properly conducted meta-analysis should begin with the development of a protocol that describes the criteria to be used for identifying and including studies (both published and non-published), methods to be used for evaluating and incorporating study quality, heterogeneity, subgroup analysis, and other relevant factors. A thorough qualitative assessment of the characteristics, strengths, and weaknesses of all available studies should precede any quantitative treatment of the data. Expert judgment is essential in the design, analysis, and interpretation of results.

10. Consider assigning a "reasonable worst case" default value when insufficient toxicological information is available to assess a chemical. The present regulatory structure may inhibit development of risk information beyond what is required by law if a substance or scenario about which little or nothing is known is effectively treated as "safe." Assigning a "reasonable worst case" default value to ignorance would remove this potential bias. Any knowledge subsequently developed about the substance or scenario would be used to modify this *a priori* reasonable worst case assumption.

A Risk Manager's Wish List

High up on the list of information that risk managers yearn to receive from risk assessors are real-life stories and a description of the "big picture," according to a study by two researchers in Durham, North Carolina.

SRA members Diane Bloom, head of Bloom Research, and Dianne Byrne, chief of the Program Analysis and Technology Section of the U.S. Environmental Protection Agency, presented their study titled "Communicating Risk to Risk Managers" in December at the 1992 SRA Annual Meeting.

Using information gleaned from their study, the two researchers compiled a top-10 list of information that risk managers say they need:

1. Give the big picture first. "I need to have a sense of where the pollutant falls in the spectrum," one risk manager told the researchers. "If you have a really bad actor like chromium, you want to go after it."

2. Answer key questions. "They want to know how serious is the health effect — are we talking about death or a runny nose?" said Bloom. "How many people are exposed? Who else agrees with this risk analysis?"

3. Provide a qualitative description, not just a number. "Risk managers have found that reports based just on numbers were much more likely to be attacked," Byrne said. "Have two paragraphs giving a qualitative description. Tell why a pollutant should be regulated. This helps risk managers make their case to others outside their department."

One risk manager told the researchers, "If you start focusing on whether the risk is 1×10^{-4} or 1×10^{-3} , people will never get beyond that because they'll focus on three versus four. Go back to the goal: What are you trying to regulate and why?"

4. Use real-life stories and powerful analogies. "Accurate sound bites are good communication tools when

dealing with a non-science audience," Bloom said.

One risk manager told of a Los Angeles study of the lungs of children killed in violent incidents. "The study found that you had to locate a child under 10 years old to find an undamaged lung. People couldn't argue with me when I stood up and said that air pollutants were harmful."

5. Tell not only what you know, but what you suspect. "If there is a strong possibility there are non-cancer effects, but you haven't had the resources to document them, risk managers want to know," Bloom said.

6. Spare the minute technical details. "Risk managers don't need calculations. They need to know how to explain the final conclusion," Byrne said.

"When you get to my level, people don't understand what the bioassay results of a particular chemical mean. I need for (risk assessors) to say, 'This chemical causes sterility,'" said one risk manager.

7. Remember that good science isn't enough. A risk assessor's ability to communicate information to risk managers is critical, Byrne said.

8. Point out where data are weak. One risk manager interviewed during the study said, "There's nothing as embarrassing as thinking I have a complete story and having someone blow me out of the water with a fact I didn't know."

9. Give a sense of the uncertainties. "We heard over and over that they don't want the details of the uncertainty of every calculation," Byrne said.

10. Identify the positions of the stakeholders. "When I go out and announce a decision, I want to know what kind of arguments we will confront," one risk manager said during the study.

"What kinds of questions can they expect from stakeholders such as the regulated industry?" Bloom said.

SRA-Japan to Co-sponsor Joint Meeting in Hawaii

One of SRA-Japan's projects during 1993 is beginning plans for a joint 1995 Annual Meeting in Hawaii with the international Society for Risk Analysis, said SRA Councilor Saburo Ikeda at the 1992 Annual Meeting in San Diego. Ikeda is secretary and deputy president of SRA-Japan.

This is the first time that the Society will both hold a joint annual meeting with SRA-Japan and select a site outside the continental United States. Officials in both organizations will be involved in the planning.

SRA-Japan is also planning two meetings of its own. The 1993 Spring Annual Meeting and Workshop is on June 25 in Sanzyo Hall at the University of Tokyo. The meeting's topic is "Approaches Toward Risk Analysis," with Ken Tsuchiya, former president of the Medical College of Industry and Labor, as the guest speaker. The Sixth Annual Meeting and Symposium of SRA-Japan is on November 26-27 in Tokyo. The main theme is "Informed Consent and Risk Communication."

Membership

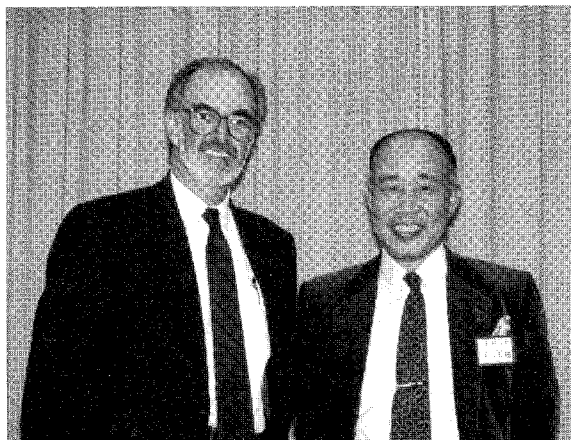
SRA-Japan now has 286 full members, eight student members, and 16 corporate members.

Publications

The section is publishing a special issue of its annual journal this year, titled *Risk Lexicon*. The editorial committee has selected 35 items to include in the short survey on risk sources, assessment, and management. The latest issue of the journal, *Japanese Journal of Risk Analysis*, was published in November 1992 and included papers presented at the Fourth Annual Conference of SRA-Japan. Topics include risk problems in waste management, an economic analysis of life insurance, and risk assessment of tumor promoters using no-observed-effect-level data.

The journal also included the proceedings of a symposium on the risk control of chemicals and a research paper on the database RiskView. SRA-Japan also continues to publish its quarterly newsletter.

North Reports on Visit to Japan



Warner North (left) with President Tomio Kinoshita.

D. Warner North, the immediate past president of the Society for Risk Analysis, reports on his visit with members of SRA-Japan in November 1992.

It was a great pleasure for me to participate in the SRA-Japan Fifth Annual Meeting in November. My trip began in Tokyo with a meeting with the Radioactive Waste Management Project of the Japan Power Reactor and Nuclear Fuel Development Corporation for a discussion of programs for disposing of the radioactive wastes from nuclear power generation.

The next day I gave a lecture for members of SRA-Japan from the Tokyo area, followed by a dinner with many of the council members of SRA-Japan. I enjoyed the ride by high-speed train to Kyoto and the opportunity to visit a small sample of the temples in this beautiful and historic city while attending the meeting.

Annual Conference

About 100 participants attended the Fifth Annual Conference of SRA-Japan at Kyoto University in November 1992. SRA past president D. Warner North was the invited lecturer for the conference (see box above). A symposium on urban risk issues was held, and

I was impressed by the extent of the dialogue and active questioning following my talks and in informal conversations. In Japan, as in the United States, many points of view on risk analysis exist, reflecting a diversity of disciplinary backgrounds and experience. SRA gives us opportunities to learn from each other. Such learning is clearly going on within the United States, within Japan, and through existing professional associations between the two countries. I hope that the professional associations within SRA as an international society will continue to expand, to the benefit of its members in all countries.

I would like to express my appreciation to my hosts, especially to Saburo Ikeda, who has been Japan's ambassador to the SRA Council; to Tomio Kinoshita, the Japan Section's president and academic host for the Fifth Annual Meeting; to Sadayoshi Kobayashi, who graciously introduced my talk in Tokyo; and to Taketoshi Taniguchi, who kept me on time and on course throughout my visit. I was pleased with the positive reception from SRA-Japan's Council to the proposal for a 1995 joint annual meeting in Hawaii. We from the United States will look forward to working with our Japanese colleagues to make this meeting a huge success.

20 papers were presented on risk assessment and risk management.

To contact SRA-Japan write or call: SRA-Japan Section, c/o Saburo Ikeda, University of Tsukuba, (see address on page 24) telephone number (298) 53-5380, fax number (298) 55-3849, e-mail: ikeda@shako.sk.tsukuba.ac.jp.

Pass the Word: E-mail Is Catching On

From Croatia to Japan to the United States, SRA members are touting electronic mail as the fastest way to communicate with one another.

It only takes a few seconds for an e-mail message to zip from a computer in New York City to a computer in Tokyo, says Kandice Salomone (e-mail: salomone@sol.acs.unt.edu), an SRA member who is a research methodologist with Rutgers University.

"E-mail is the most efficient way to communicate," says Salomone, who uses a computer in her home office in Denton, Texas, daily to send e-mail to colleagues across the nation. "The first thing I do in the morning is log on and read my messages."

She points to how she used e-mail to set up a panel discussion for a recent conference. "Rather than playing phone tag, I could send detailed messages to people in Wisconsin, Texas, and Ohio."

Opening Doors

SRA member Tom Hatfield credits e-mail for making a guided tour of Chernobyl, Ukraine, possible.

"I sent messages to an e-mail discussion group called Russia, saying that I was interested in going to Russia and that my background was in environmental risk analysis. Several people responded, sending me nine e-mail addresses of people in the former Soviet Union," says Hatfield (e-mail: thatfield@vax.csun.edu) from his office at the California State University in North Ridge.

"I sent messages to the nine addresses, and one man in Kiev responded. He invited me to visit him and personally took me on a tour of Chernobyl," Hatfield says. "The whole thing happened through e-mail, from one scientist to another."

One SRA member's fascination with e-mail led to a book project. Susan Hadden, a professor of public policy and government at the University of Texas in Austin, is writing a book on telecommunications policy after using e-mail for years.

Linking East and West

Academicians in Eastern Europe want to use e-mail to tap the knowledge and expertise of university professors in the United States and Western Europe, said Ante Lauc of the University of Osijek in Croatia.

"In my country, we have an electronic university where our students can learn from the best minds in the world," Lauc said during an interview in December at the 1992 SRA Annual Meeting in San Diego. "If every Western professor has one hour per week for students in developing countries, knowledge can be exchanged and problems will be solved.

"I suggest that we exchange electronic addresses so that all of us can be in touch all the time," said Lauc (e-mail: lauc@uni-zg.acmail.uyu). "The differences between the East and the West and between the North and the South can be overcome through high technology."

SRA Secretary Vlasta Molak has long championed e-mail as a way for the risk community to communicate.

"With electronic mail, we could overcome the problems we have communicating to people in other countries," said Molak (e-mail: usr1789a@cbo.uc.edu), whose company Gaia Unlimited Inc. is based in Cincinnati, Ohio. "I would like to see the whole globe connected with electronic mail."



Ante Lauc

For Hadden, e-mail has become a family affair. "Both of my kids are away at college. Rather than calling their dorms and not finding them there, I send e-mail."

Hooking Up to E-mail

To use electronic mail, the first step is having a modem installed in your computer. A modem, which costs about \$80 in the United States, sends messages through telephone lines from one computer to another.

The second step is getting a personal e-mail address, which is similar to a telephone number. You can receive an e-mail address by subscribing to any of the dozens of e-mail systems that are linked to the Internet, which is a global network of e-mail systems. The cost of

subscribing varies from a flat rate of \$20 to \$40 a month for users who live in major cities. Outside of major cities, users usually have to pay additional fees that vary from \$2 to \$7 per hour to cover long-distance telephone charges.

Two national networks that sell e-mail accounts to individuals and businesses are PSLink, operated by Performance Systems International Inc., and Worldlink, operated by InterCon Systems Corp., which are both based in Reston, Virginia. To contact PSLink call (518) 283-8860 and to contact Worldlink call (703) 709-5500.

SRA members can have their e-mail addresses printed in the next SRA Membership Directory by sending their e-mail addresses to the editor of the RISK newsletter.

SRA-Europe Faces Unique Challenges

As he assumes office, SRA-Europe President Marc Poumadère assesses the challenges facing the European Section.

The situation in Europe today is characterized by an ever increasing demand for risk analysis skills. Industries and governments are beginning to realize the need for a multidisciplinary approach to risk issues; and, as the demand grows, universities and professionals must adjust their training and practice. SRA-Europe is a resource in this context.

A second characteristic of Europe is its fragmentation, despite the presence of the unified market among 12 countries. Our American or Japanese colleagues may not fully imagine the difficulties posed by the multiplicity of languages, practices, and national and organizational value systems. These have an impact on decision making processes, management and organizational structures, and practices and ethics in, for example, risk communication with the public.

Within the European Community member states, unanticipated difficulties have been encountered for the ratification of the Treaty of Maastricht (which specifies power and decision structures in the new Europe). A division has been revealed between the position expressed by the public by referendum—sometimes against the treaty—and the interests of decision makers in political and business spheres—generally in favor. The adhesion of citizens to the new political structure and implied transnational coherence represents a risk issue. A full program of risk analysis and management is perhaps not possible at such a level; but, in any case, the need for analysis and preparation escaped the anticipation of leaders.

Another great division has become undeniable in the difference between industrial, social, and economic conditions in Western and Eastern Europe. With the opening of the East, these differences have become unacceptable. A pressing challenge in risk management is bringing up to standard the

Poumadère Is SRA-Europe President

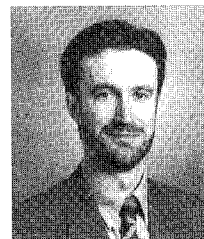
Marc Poumadère, a charter member of the European Section, took office in January as the third president of SRA-Europe, succeeding R. A. (Tony) Cox. Poumadère is Program Director at Institut SYMLOG, France.

Poumadère received his Ph.D. in organizational behavior from the University of Paris in 1978 and spent two post-doctoral years at the Laboratory of Social Relations in the Psychology Department of Harvard University. He has been an advisor to the World Health Organization in Geneva and teaches a doctoral seminar, "Managing Technical and Social Risks," at the Ecole Normale Supérieure de Cachan.

Acting as a consultant or study advisor for private and governmental organizations, Poumadère also develops programs aimed at decentralizing risk analysis in operating systems such as nuclear power plants or addressing issues of risk perception

and communication in the public at large.

Currently, Poumadère is collaborating with Paul Slovic and Decision Research on a comparative



Poumadère

study of perceptions of nuclear energy in the United States and France. He is carrying out a comparative evaluation of risk communication in the area of radioactive waste management for the European Commission. Poumadère also provides evaluation and management support in the decommissioning of France's gas-graphite reactor units.

Correspondence with the European Section in 1993 should be sent to Poumadère at Institut SYMLOG, B.P. 125, 94230-Cachan, France, telephone 33 1 4540 0990, fax 33 1 4740 8258.

control of industrial processes, particularly in the energy and chemical fields. Cooperation efforts are under way, with the importation of experts and operators to provide support, especially to nuclear production sites. These individuals can testify to differences in risk perception as they steel themselves daily to enter their new work places.

Two challenges emerge then on the European risk analysis scene, challenges to which SRA-Europe may rise. Within Europe, we can seek to consolidate visions and practices which will incorporate the best of our assembled experience. We must also be active in cooperating with our neighbors in Eastern Europe.

In this light, we look forward to SRA-Europe's Fourth Conference, to be held on October 18-20, 1993, in Rome. Organized by Paulo Vestrucci and Tony Cox, the conference will gather European SRA members and

others attracted by the concept of a truly multidisciplinary exchange on "European Technology and Experience in Safety Analysis and Risk Management: 10 Years After the Sevesco Directive."

Europe faces many of the same challenges as America and Japan in the management of technological processes and their waste products. As president of SRA-Europe, I have great hopes for the development of the European Section of SRA. I am proud of the diversity of vision and richness represented by, for example, what may seem to be a rather exotic Executive Committee: members are British, Dutch, French, German, Italian, Norwegian, Russian, and Swiss. I hope that SRA-Europe will provide more and more a basis for exchange amongst Europeans and with our foreign colleagues.

Marc Poumadère
President, SRA-Europe

Holland Launches USES System

In December 1992, the second prototype of the Dutch Uniform System for the Evaluation of Substances (USES) was launched by the Dutch Ministry of Housing, Physical Planning, and Environment. This prototype, developed by the Dutch National Institute of Public Health and Environmental Protection and Resources Planning Consultants Ltd., will undergo extensive review by experts, including the Commission USES of the Dutch Health Council and potential users. The system officially will be issued in late 1993.

USES is being developed in order to comply with the Dutch National Environmental Policy Plan. The main aim of the project is the development of a user-friendly system, running on a personal computer, for the rapid evaluation of the environmental risks of substances. USES is to be applied as a decision support system by government, industry, and institutes.

Three specific functions can be distinguished in USES:

1. The initial hazard and risk assessment of new substances: this subsystem is called Dutch Risk Assessment System of New Chemicals;

2. The prioritization of existing chemicals: this subsystem is called Priority Setting System for Existing Chemicals;

3. The assessment of pesticides: this subsystem is called Evaluation System for Pesticides.

In each system, exposure levels for target organisms are estimated and related to the results of the effects assessment. Target organisms are in each case aquatic and terrestrial organisms, micro-organisms in a sewage treatment plant, and man as exposed through the environment and directly via consumer products. The modular structure of each subsystem is the same and, wherever possible, the same model descriptions are used.

For information, contact Wout Slob, National Institute of Public Health and Environmental Protection (see page 15 for address).

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21 Countries Represented at SRA Annual Meeting

Twenty-two countries from Korea to Mexico were represented at the 1992 SRA Annual Meeting in San Diego. Following is a list of 50 attendees from countries outside the United States that the RISK newsletter compiled.

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Joseph Szekely; AECL Research; STN 46 Pinawa; ROE 1LO; Canada.

Dennis Waithe; Agriculture Canada; RM 631; Sir John Carling Building; 930 Carling Ave.; Ottawa, Ontario K1A 0C5; Canada.



Mexico delegation: Alberto Jaime, Luis Barojas, and Cristina Cortinas de Nava (*top, from left to right*) were members of a special panel session on air pollution risk analysis in Mexico and the former Czechoslovakia at the 1992 SRA Annual Meeting. **From Eastern Europe:** Alena Pilvanova of the Slovak Republic was one of four attendees from the former Czechoslovakia.

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UNITED KINGDOM

Tim Auton; ICI Central Toxicology Lab; Macclesfield; Cheshire; United Kingdom; telephone 446 255 1287.

Juli Brainard, Simon Gerrard, Andrew Lovett, and Abbe Simpson; all of the University of East Anglia; Environmental Risk Assessment Unit; Norwich NR4 7TJ; United Kingdom.

R.A. (Tony) Cox (see page 24 for address).

Call for Nominations for SRA Fellows

The SRA Awards Committee invites nominations for the award of Fellow of the Society for Risk Analysis. The award, which was established by the SRA Council in 1991, recognizes and honors members who have compiled a professional record marked by significant contributions to one or more of the disciplines served by the Society. Such contribution may be evidenced by one or a combination of the following: (a) recognized, original research, application, or invention; (b) technical, scientific, or policy analysis leadership in an enterprise of significant scope that involves risk analysis in a substantial way; (c) superior teaching or contributions to improve education and to promote the use of risk analysis that are widely recognized by peers and students; or (d) service to or constructive activity within the Society of such a quality, nature, and/or duration as to be a visible contributor to the advancement of the Society. The Awards Committee will weigh the total contributions of each nominee in these four areas in arriving at its recommendations to the SRA Council. Nominees must have been members of SRA for at least five years and must now be members in good standing. Only 1% of Society members per year may be selected. Each past president also receives recognition as a Fellow of SRA.

Nominations are to be made on a standard form by three members of the Society who must be broadly dispersed geographically and of whom, only one, at most, can be from the home institution of the candidate. Forms may be obtained by contacting the office of the Executive Secretary of SRA (see Secretariat's address in the newsletter masthead).

Send completed forms by April 30, 1993, to one of the following committee members:

B. John Garrick, Chairman
President
PLG Inc.
Suite 400, 4590 MacArthur Blvd.
Newport Beach, CA 92660-2027
Telephone (714) 833-2020
Fax (714) 833-2085

Caron Chess
Director, Environmental Communication
Research Program
Rutgers University, Cook College
P.O. Box 231
New Brunswick, NJ 08903-0231
Telephone (908) 932-8795
Fax (908) 932-7815

Chris G. Whipple
Vice President
ICF/Kaiser Engineers
Environmental Group, 7th Floor
1800 Harrison Street
Oakland, CA 94612-3430
Telephone (510) 419-5516
Fax (510) 410-5355

Fellows Named

(Continued from page 1.)

scientists interested in SRA in June. One of his hosts, Naum Borodianskii, has since organized an official SRA chapter in Kiev.

"The end of the cold war provides an unprecedented opportunity for cooperation on environmental risk problems," North said. "Through local SRA chapters and exchange visits, the Society can play a leading role."

In light of the contacts North has developed abroad, President Jim Wilson has encouraged him to continue as international ambassador for SRA.

North is a founder and senior vice president of the consulting firm Decision Focus Inc. He has advised corporations and government agencies in the United States, Canada, Europe, and Mexico on environmental risk issues. He has served on the U.S. Environmental Protection Agency's Science Advisory Board, the Nuclear Waste Technical Review Board, and numerous committees of the National Research Council. North is also a consulting professor

in Stanford University's Department of Engineering-Economic Systems.

Hohenemser is a founder of Clark University's Environment, Technology, and Society Program, which was created to teach students about dealing with complex technical issues in a societal context. He works in solid state physics and environmental risk analysis.



Hohenemser

Hohenemser's risk analysis includes producing one of the first comprehensive assessments of the consequences of the Chernobyl nuclear reactor explosion. Doing research in Bavaria at the time the explosion occurred, he was among the first to discover the extent of nuclear fallout. Other areas of risk he has studied include nuclear arms, energy efficiency, automobile safety, airborne mercury, hazard models, and the physical and institutional aspects of nuclear power. Hohenemser received the United Nation's bronze

medal for distinguished contributions to the environment in 1982.

"At Clark, he has worked closely with Robert Kates, Roger and Jeanne Kasperson, and Rob Goble, blending his understanding of the physical sciences with a sensitivity to the social, psychological, and economic issues central to risk management," said former SRA president Paul Slovic.

In addition to his long-term interest in evaluating risks, Hohenemser is also considered a leading researcher in the field of high temperature superconductivity. He received his Ph.D. in physics from Washington University in St. Louis.

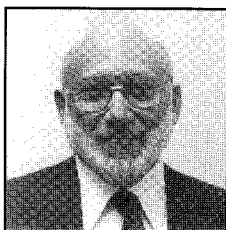
Corrections from Last Issue:

SRA Fellow Yacov Y. Haimen received his bachelor of science degree in mathematics, physics, and chemistry from the Hebrew University. SRA Fellow M. Granger Morgan is head of the Department of Engineering and Public Policy at the Carnegie Institute of Technology.

Two Named to Risk Commission

Joshua Lederberg, a Nobel prize winner, and Gilbert S. Omenn, a dean at the University of Washington, are the latest appointments to the national Risk Assessment and Management Commission. Both were appointed by Speaker of the House of Representatives Thomas S. Foley.

At age 33, Joshua Lederberg received the 1958 Nobel Prize in physiology, in part for his discovery of genetic recombination in bacteria. A



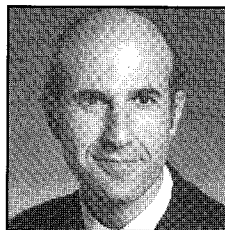
Lederberg

pioneer in the field of bacterial genetics, he retired in 1990 as president of Rockefeller University in New York City. The geneticist continues his research activities there in the field of transcriptional specificities in mutagenesis in bacteria.

Lederberg currently chairs the congressional Technology Assessment Advisory Council and has been a member of the National Academy of Sciences

since 1957. He was educated at Columbia University and Yale University.

Omenn has been dean of the University of Washington's School of Public Health and Community Medicine in Seattle since 1982. From 1977 to 1981, he was a deputy to President Carter's Science and Technology Adviser Frank Press, who is now president of the National Academy of Sciences. During this time, he also was an associate director of the U.S. Office of Management and Budget for two years.



Omenn

Omenn's research and public policy interests include genetic predisposition to environmental and occupational health hazards, chemoprevention of cancers, health promotion for older adults, and risk analysis. He co-authored the influential study "Clearing the Air: Reforming the Clean Air Act" in 1981.

The Risk Assessment and Management Commission, whose work is

expected to have a major impact on the government's use of risk analysis in setting federal regulations, has yet to hold a meeting. This is because Majority Leader of the Senate, Sen. George Mitchell, D-ME, has not made his required two appointments to the commission. The RISK newsletter staff has repeatedly requested an explanation for Sen. Mitchell's delay, which is in violation of the 1990 Clean Air Act Amendments that mandated that all appointments to the commission be made by May 15, 1992.

Others appointed to the 10-member commission are SRA member Bernard Goldstein, director of the Environmental and Occupational Health Sciences Institute in Piscataway, NJ; SRA member Anthony Thompson, a lawyer with Perkins Coie in Washington, D.C.; Thorne Auchter, director of the Institute for Regulatory Policy in Washington, D.C.; Barbara A. Bankoff, president of Bankoff Associates in Washington, D.C.; John Doull, professor at the University of Kansas; and Virginia V. Weldon, vice president of public policy at Monsanto Co.

Risk Research Grants Available

Applications are now being accepted for research grants of up to \$75,000 from the Joint National Science Foundation (NSF)/Private Sector Research Initiative (PSI). The Foundation's Decision, Risk, and Management Science Program based in Washington, D.C., administers the grants.

PSI supports research that advances the objectives of the Decision, Risk, and Management Science (DRMS) Program and is grounded in theory but also has an operational context. PSI fosters partnerships between researchers at universities and in the private sector by encouraging theory building through applied studies in operational and managerial processes, risk management, and organizational decision making. Through this joint program the NSF matches private sector funds up to \$75,000 per year for two years.

Since 1991, 15 awards have involved participants such as the airline, computer, and environmental industries. In 1992, \$1.3 million in funds from the NSF and the private sector were awarded.

Successful proposals in past years share several characteristics. Most successful proposals start with a good idea or a novel research direction. They contain well thought out research plans that detail the research methods, demonstrate the feasibility of the approach, and discuss anticipated contributions and potential limitations. Finally, they include a reasonable budget.

The DRMS Spring 1993 advisory panel members are: Colin Camerer, University of Chicago; Jehoshua Eliashberg, University of Pennsylvania; Baruch Fischhoff, Carnegie Mellon

University; Yacov Y. Haiman, University of Virginia; Roger E. Kasperson, Clark University; Craig Kirkwood, Arizona State University; Rakesh Kumar Sarin, University of California, Los Angeles; Claudia Schoonhoven, San Jose State University; and J. Frank Yates, University of Michigan. (Note: Contact the program directors listed below, *not* panel members, for information.)

The submission deadlines are January 15 and August 15.

For more information, call program directors Robin Cantor (e-mail: rcantor@nsf.gov) and N. John Castellan Jr. (e-mail: jcastell@nsf.gov) at (202) 357-7417. Or write to the DRMS Program, National Science Foundation, Room 336, 1800 G Street NW, Washington, D.C., 20550.

SRA Specialty Group Reports

Engineering Group Reorganizes

SRA's Engineering Specialty Group was reorganized at the 1992 Annual Meeting under the leadership of Robert J. Mulvihill of PRC Inc., who was appointed chairman of the group last September by former SRA President Warner North.

Two goals of the group are to increase the number and quality of engineering sessions at the SRA annual meetings and to increase the number of papers submitted to the SRA journal, *Risk Analysis*. A member of the group will also be appointed to act as the journal's assistant technical editor for engineering articles.

Other goals are cooperative programs with engineering societies and with PSAM-II.

Mulvihill is currently working on an interface with the American Society of Mechanical Engineers (ASME), and Frank Dombek and Dennis Henneke, both of Halliburton NUS Environmental Corporation, are working on an interface with the American Institute of Chemical Engineers (AIChE). Interfaces with the American Nuclear Society (ANS) and IEEE were also suggested. (At the subsequent SRA Council meeting in San Diego, Mulvihill and two former SRA presidents, D. Warner North and Curtis Travis, were asked to develop a specific interface proposal for presentation to ASME.)

Several members of the Engineering Specialty Group are principals in PSAM-II, which will be incorporated in California and will hold its second conference in March 1994 (see second Call for Papers for PSAM-II on page 25). PSAM will be affiliated with SRA primarily through the Engineering Specialty Group, with each group supporting the activities of the other. One activity to be pursued is a topical session at the 1993 SRA Annual Meeting that will demonstrate how the mix of disciplines present within SRA can be used to address a particular problem area.

The following committees have been set up under the Engineering Specialty Group:

Geotechnical Committee. Ram Kulkarni, Chair, Woodward-Clyde Consultants, 500 12th Street, Suite 100, Oakland, CA 94607-4014, telephone (510) 893-3600, fax (510) 874-3268. (Note: Where only the chairman is named, additional committee members have not yet been named.)

Probabilistic Design Committee. Doug Orvis, Chair, Accident Prevention Group, 16980 Via Tazon, San Diego, CA 92127, telephone (619) 592-0189, fax (619) 592-0586.

R. A. (Tony) Cox, Four Elements Ltd., Greencoat House/Francis Street, London SW1HOEX, United Kingdom, telephone (071) 973-8041, fax (071) 973-8042.

Robert Deshotels, Fluor-Daniel Inc., 3333 Michelson Drive, Irvine, CA 92730, telephone (714) 975-5661, fax (714) 975-5004.

Risk Analysis Methodology: Ali Mosleh, Chair, University of Maryland, College Park, MD 20742-2115, telephone (301) 405-5215, fax (301) 314-9467.

Vicki Bier, University of Wisconsin-Madison, Department of Industrial Engineering, 389 Mechanical Engineering Building, 1513 University Avenue, Madison, WI 53706, telephone (608) 262-2064, fax (608) 262-8454.

Austin J. Lemoine, Failure Analysis Associates Inc., 149 Commonwealth Drive, P.O. Box 3015, Menlo Park, CA 94025, telephone (415) 688-7369, fax (415) 688-7369.

Process Safety Management. Frank S. Dombek, Chair, Halliburton NUS Environmental Corporation, 6885 W. Bernardo Drive, Suite 100, San Diego, CA 92128, telephone (619) 451-2131, fax (619) 451-1770.

Dennis W. Henneke, Halliburton NUS Environmental Corporation, 6885 W. Bernardo Drive, Suite 100, San Diego, CA 92128, telephone (619) 451-2131, fax (619) 451-1770.

Louis Goossens, University of Technology Delft, Kanaalweg 2B2628 EB DELFT, Netherlands, telephone 31 15 781080, fax 31 25 622235.

Willard C. Gekler, PLG Inc., 4590 MacArthur Blvd., Suite 400, Newport Beach, CA 92660-2027, telephone (714) 833-2020, fax (714) 833-2085.

Nuclear Power Plant Risk Assessment. Karl Fleming, Chair, PLG Inc., 4590 MacArthur Blvd., Suite 400, Newport Beach, CA 92660-2027, telephone (714) 833-2085, fax (714) 833-2085.

Stanley H. Levinson, BWNI, 3315 Old Forest Road, Lynchburg, VA 24501, telephone (804) 385-2768, fax (804) 385-3663.

Programmatic Risk Evaluation. Robert J. Mulvihill, Chair, PRC Inc., 222 N. Sepulveda Blvd., Suite 1310, El Segundo, CA 90245, telephone (310) 640-1050, ext. 117, fax (310) 640-2207.

Peter Prassinis, U. S. Department of Energy, P.O. Box 5400, Albuquerque, NM 87185-5400, telephone (505) 845-5835, fax (505) 845-4209.

Human Factors/Reliability. Tony Spurgeon, Chair, Accident Prevention Group, 16980 Via Tazon, San Diego, CA 92127, telephone (619) 592-0189, fax (619) 592-0586.

Aerospace. Ralph Miles, Chair, Jet Propulsion Laboratory, 4800 Oak Grove Drive, Pasadena, CA 91109, telephone (818) 354-1066, fax (818) 393-6734. Sergio Guarro, Aerospace Corporation, 2250 East El Segundo Blvd., El Segundo, CA 90245-4691 (Mailing Address: P.O. Box 92957, Los Angeles, CA 90009-2957), telephone (310) 336-8610, fax (310) 336-5581.

Michael V. Frank, Safety Factor Associates, 1410 Vanessa Circle, Encinitas, CA 92024, telephone (619) 436-9132.

Michael Maharik, Rafael, Dept. 40, P.O. Box 2250, Haifa 31021, Israel, fax (972) 4-794509.

Ben Buchbinder, NASA, Code ZS, 3rd & E Streets SW, Washington, DC, 20546, telephone (202) 358-0592.

Offshore Petroleum Facilities. M. E. Elisabeth Pate-Cornell, Chair, Department of Industrial Engineering and Engineering Management, Stanford University, Stanford, CA 94305, telephone (415) 723-3823, fax (415) 725-8799.

For further information on the Engineering Specialty Group, contact Robert J. Mulvihill at his address given above under Programmatic Risk Evaluation.

Ecological Risk Group Sets Goals

Approximately 25 specialists from diverse fields attended the Ecological Risk Assessment Specialty Group meeting at the 1992 SRA Annual Meeting to discuss the year's achievements and set goals for 1993. The meeting was chaired by Larry Barnhouse of Oak Ridge National Laboratory.

After noting that there was standing-room-only attendance at the 1992 ecological risk assessment sessions, the group discussed the significant challenges involved in measuring and communicating ecological risk. Participants' suggestions for topics at future annual meeting sessions spon-

sored by the specialty group include more presentations of applied risk assessments—particularly governmental and industrial projects—which outline applications of theory and policy, problems encountered, and lessons learned; interdisciplinary topics, such as the integration of human health and ecological risks at some Superfund sites; differences in the approaches of state and federal agencies to ecological risk assessment; outreach with other professional societies that have expertise in ecological risk assessment and related areas, such as the Ecological Society of America; how ecological risk assessment fits into the field of ecological research; communication between ecological risk assessors and the public; and the need for fundamental definitions in the field of ecological risk assessment.

Acknowledging the rich diversity of perspectives represented among its members, the group set a goal of achieving the submission of at least six articles on the subject of ecological risk assessment to the society's journal, *Risk Analysis*, during 1993. It was noted that only two or three ecological risk assessment articles had ever been published in the journal and that the journal would be expanding to six issues in 1993, creating a window of opportunity for publication. Authors wishing to contribute articles to this effort should contact Doug Johnson, Ebasco Environmental, 10900 N.E. 8th Street, Bellevue, Washington 98004-4405, telephone (206) 451-4198, fax (206) 451-4187.

The group also reaffirmed its commitment to the growth of its informal network of SRA members interested in ecological risk assessment. Anyone wanting to be included should send name, address, and telephone, fax and e-mail numbers to Larry Barnhouse, Environmental Sciences Division, Oak Ridge National Laboratory, P.O. Box 2008, Oak Ridge, Tennessee 37830-6036, telephone (615) 574-7393, fax (615) 576-8543, e-mail: LWB@ORNL.gov.

Exposure Assessment Group Organizes Workshop

In preparation for the 1993 SRA Annual Meeting, the Exposure Assessment Specialty Group is organizing a Monte Carlo workshop that will include sessions on applications as well as techniques.

This follows the group's successful workshop on its Reference House project at the 1992 Annual Meeting, which more than 40 people attended. Jeffrey Driver, Bert Hakkinen, and Gary Whitmyre co-chaired the workshop and are now forming committees to work on major areas of the proposed book, which may include a software appendix. (See box on this page.) In July, the three co-chairs will present a poster on the Reference House project at the Sixth International Conference on Indoor Air Quality and Climate.

At the specialty group's evening meeting during the 1992 Annual Meeting, the 25 members present elected the group's 1993 officers. Paul Price of ChemRisk was named chair, and Bob Fares of Versar Inc. was named chair-elect/secretary.

Reference House Book Underway

A project created by the Exposure Assessment Specialty Group has caught the attention of the U.S. Environmental Protection Agency.

The EPA is considering working with the Society for Risk Analysis to produce a reference book on residential exposure assessment, a concept that the specialty group spawned in 1991.

"The EPA is interested in having SRA manage the development of the reference book," said SRA President Jim Wilson.

SRA members Jeff Driver, Gary Whitmyre, and Bert Hakkinen met with EPA officials on February 10 to discuss the project. The EPA indicated that the agency most likely could supply partial funding for the project and requested a formal proposal from SRA.

In response to the EPA's request, Wilson created the Residential Exposure Assessment Proposal Committee. The committee will draft SRA's proposal and will function until the EPA accepts the proposal.

Committee members, who will report to the Executive Committee of the SRA Council, are Driver, Hakkinen, Whitmyer, and David McCallum. They expect to submit a proposal to the EPA in April.

The goal of the project is to create a one-volume reference book on consumer and indoor exposure information. "The book will serve as one place where all the data is collected," Wilson said.

As chair, Price will serve for one year and will be responsible for interacting with the SRA Council, other specialty groups, and outside professional societies such as the International Society for Exposure Assessment. His duties include communicating the ideas, concerns, and policy issues of the group to the SRA Council. As chair-elect/secretary, Fares will serve a one-year term and will be responsible for maintaining a directory of group members, for overseeing special mailings, and for reporting to the *RISK newsletter*.

Paper and poster topics suggested for the group's sessions next year included infiltration of contaminants into houses, results from the National Human Exposure Survey, bioavailability, dermal uptake, biomarkers, limitation of regulatory models, and updates on the U.S. Environmental Protection Agency's residential exposure assessment and all EPA guidance documents.

The group also continues to interact with the International Society for Exposure Assessment through liaisons Price and Tom McKone.

"The interest generated as a result of the interaction between the two groups resulted in the presentation of about

(Continued on page 20.)

SRA Specialty Groups

(Continued from page 19.)

55 platform papers and 20 posters on exposure assessment at the 1992 Annual Meeting," Fares said.

Anyone who has suggestions concerning the group's plans for a Monte Carlo workshop can contact Price at (207) 774-0012, David Burmaster at (617) 864-4300, or Fares at (703) 642-6863.

Risk Communicators Organizing Network

Encouraging communication among researchers and adopting a mission statement are two of the Risk Communication Specialty Group's projects for 1993.

About 50 members of the specialty group met at the 1992 SRA Annual Meeting in San Diego to chart a course for the upcoming year. Projects discussed, as well as committee leaders, include:

- Developing a risk communication e-mail network, Kandice Salomone of Rutgers University, telephone (908) 932-8795;
- Revising the group's proposed mission statement, Richard Rich of Virginia Polytechnic Institute, telephone (703) 951-7707;
- Updating the Risk Communication Specialty Group Directory, Karen Irons of the SRA Secretariat's Office, telephone (703) 790-1745;
- Assessing risk communication research needs for government agencies through a cooperative program between Rutgers University and the U.S. Environmental Protection Agency, Lynn Marie Luderer of the U.S. EPA, telephone (202) 260-6995;
- Organizing risk communication sessions for the 1993 SRA Annual Meeting, Virginia Sublet of the Agency for Toxic Substances and Disease Registry, telephone (513) 321-6704;
- Creating a governance structure for the specialty group, Bob O'Connor of Penn State University, telephone (814) 863-0732;
- Collaborating with researchers in other risk communication groups, Judy Selig of The Calamus Group, telephone (303) 258-7888;
- Evaluating risk communication, Ortwin Renn of the Academy for Technical Assessment in Germany, telephone (711) 678-3160 or (411) 940-7445;

For more information, contact Chairperson Ann Fisher, telephone (814) 865-3143 or communications committee leader Kelly Sund, telephone (202) 483-0304.

Global Group Aims for Data Base

The SRA specialty group known as GRASP—Global Risk Analysis Specialty Program—organized a set of ses-

sions at the 1992 SRA Annual Meeting, including a joint session with the Ecological Risk Specialty Group and a panel session that focused on the question of how the risk assessment community could develop a data base from the ongoing efforts of risk assessors. Problems were highlighted, especially the difficulty of getting data standardized and archived with some semblance of quality control; however, there was strong agreement that at least an index of studies to show geographical, temporal, species and chemical categories would be a valuable tool for the research community.

Identified goals included: (1) to allow work completed for one study to become known and accessible by future researchers who might be working on a similar problem, and (2) to develop this sort of data sharing internationally. The chairman of GRASP, Justin Lancaster of the Environmental Science and Policy Institute, agreed to organize a small committee to discuss further the data networking idea and present it to the Society at the 1993 SRA Annual Meeting.

Global risk session attendees also discussed building a strong collaboration between global risk analysis research and the networking between international chapters.

"Problems in Eastern Europe, particularly the strife in former Yugoslavia, became a poignant topic motivating this discussion," Lancaster said. Following the annual meeting, Lancaster contacted the Consortium for International Earth Sciences Information Network about its data exchange network involving risk analysis. The Consortium is working with several groups to build a network, including the Center for Disease Control, the World Health Organization, and the U.S. Human Dimensions of Global Change Research Program.

For more information, contact Justin Lancaster, GRASP Chairman, at Harvard University, telephone (617) 432-3330.

Member News

SRA Membership: As of February 22, 1993, those holding full membership in the Society for Risk Analysis totaled approximately 2,150. Of these, 262 are non-U.S. citizens, including 59 residing in Canada and three residing in Mexico.

Joseph Fiksel, a charter member and former treasurer of the Society for Risk Analysis, has accepted a position as principal and vice president at Decision Focus Inc. in Mountain View, California. Prior to joining Decision Focus, Fiksel was principal scientist at Teknowledge Inc. in Palo Alto, California, where he provided knowledge-based systems and services to clients in the design and manufacturing of high-technology products. From 1977 to 1986, he worked at Arthur D. Little Inc. in Cambridge, Massachusetts, where he established and directed the Decision and Risk Management Business Unit. During that period, he also was responsible for founding the New England Chapter of the Society.

Uniting the Two Cultures of Risk

Sheila Sen Jasanoff, chair of Cornell University's interdisciplinary Department of Science and Technology Studies, received the Society for Risk Analysis' 1992 Distinguished Achievement Award in December at the annual meeting in San Diego. Following is an excerpt from her address, "Bridging the Two Cultures of Risk Analysis," which she presented at the meeting.

What I want to talk about today is your recognition of the soft — or non-quantitative — side of the social sciences, and what this means for risk analysis as a whole.

Since its founding, SRA has been an interdisciplinary organization of remarkable breadth, nurturing connections among fields as diverse as engineering, toxicology, law, and psychology. Of course, social scientists are no strangers to this group. But what has the presence of people like myself in the SRA network meant to the substantive development of the field of risk analysis?

There is reason to believe that the two cultures of hard and soft risk analysis have not yet entered into a perfect communion. There is a pervasive sense that hard analysis represents risks as they really are, and that softer work such as my own mostly explains why people refuse to accept the picture of reality that technical experts produce for them. The lack of complete engagement between the two cultures of risk analysis is also reflected in the persistent vitality of the old maxim that risk assessment should be separated from risk management.

I want to lay before you a different approach to thinking about risk analysis. I want to suggest that the qualitative studies focusing on the ethical, legal, political, and cultural aspects of risk exist conceptually on a single continuum with quantitative, model-oriented and measurement-oriented analyses of risk. Both approaches are needed to produce an accounting of the nature and extent of risk in a technological society.

The starting point for my remarks today is that risk — most simply defined as the probability of a bad outcome — is a construct that we with our limited human imaginations overlay on the world around us. In order to decide what is the risk of a given negative

event, risk assessors must make a host of simplifying assumptions about the context of risk. The risks they measure therefore exist not in reality but only in an artificial micro-world of the risk analyst's creation.

Let me illustrate with examples drawn from practices in environmental risk assessment. In the models we use, dense population clusters are located downwind from highly polluting factories, pregnant women eat steady diets of pesticide-laden foods, and acid rain relentlessly drips down on red spruce forests. We know that nature and society actually behave in more complex ways, but we cannot begin to estimate the magnitude of particular risks except by building little model worlds where variation is artificially restricted.

As Adam Finkel and others have pointed out, our models for health risk assessment often do not give adequate recognition to interindividual variations in susceptibility to disease. Similarly, there are great disparities in the risk exposures of different ethnic and socioeconomic groupings in our society, which are not factored into risk analysis. Occasionally, the biases that analysts bring to the creation of risk micro-worlds are so deep-seated that it takes a major upheaval to bring them to public notice.

I am thinking, for example, of the recent discovery at the National Institutes of Health that women have been systematically under-represented in scientific inquiries concerning some of the most common diseases in American society. This rather obvious shortcoming came to national attention only when NIH's first woman director formally responded to critiques by women of conventional research funded by her organization.

The disclosure of such basic omissions in risk assessment models often surprises both experts and the public, as in the case of women's health issues

at NIH. My own culture of risk analysis offers an antidote to such surprises, because it provides a relatively systematic approach to thinking about the constraining assumptions that are built into most normal procedures for assessing risks. Pointing out directions of likely bias is probably the most important service that qualitative risk studies can render to the culture of quantitative risk assessment.

The contributions that qualitative analysts have made to the understanding of risk can be grouped under three headings: scale, interactivity, and contingency.

Let me begin with scale. The underlying assumption is that the effects risk analysts observe in miniaturized domains will reproduce themselves in the world at large. Increasingly, we use mathematical models to help us overcome the limitations of physical observation on a small scale. But modeling is an imperfect bridge to reality, and on many occasions the scale for risk analysis is so large that it misses crucial aspects of local variation. For example, a Chernobyl study by Wynne showed that British radiation experts greatly underestimated how long radiation would contaminate soil and plants in Lancashire. The error in this case was the experts' apparent failure to account for greater than expected acidity in the peaty soils of Britain's northern sheep-farming country. Examples like this will no doubt loom even larger as we try to come to grips with risk predictions on a global environmental scale.

My second point is about the interactivity of nature and society. Disasters involving technology provide the most chastening examples of material things interacting with people to produce consequences that nobody thought to predict. In the case of the catastrophic gas leak in Bhopal, a factory design that had worked safely in

(Continued on page 25.)

U.S. Chapter News

Thirteen Chapters Represented At Annual Meeting

Of the 14 SRA chapters organized in the United States, 13 were represented in San Diego at the annual chapter breakfast meeting convened by Rae Zimmerman, chair of the Sections and Chapters Committee. SRA President Jim Wilson and President-elect Robert Tardiff also attended the meeting, as well as representatives from the SRA Secretariat and RISK newsletter. The chapter members attending were: Herbert Hammond of National Capital Area, Jan Borkowski of East Tennessee, Charlie Menzie of New England, Tom McKone of Northern California, Robert Mulvihill of Southern California, Ruth Thompson of Lone Star, Rae Zimmerman of Metropolitan (CT-NJ-NY), Eileen Mahoney of Philadelphia, Jeanette Trauth and Julian Andelman of Pittsburgh, Bert Hakkinen and Jon Reid of Ohio, Julie Kimbell and Bob Hetes of Research Triangle, Kathryn Tominey of Columbia Cascades, and Doug Kononen of Michigan.

Several topics of mutual interest such as procedural issues, the provision of speakers for chapter meetings, and the encouragement of students were discussed.

The chapters have a central role in SRA, which wants to strengthen their participation, Zimmerman said. In order to assist the chapters, the Society is considering ways to streamline various procedures such as:

- Providing accounting assistance by the Secretariat, which would develop procedures for maintaining bank accounts and a handbook covering tax exemption, insurance, and incorporation;

- Expediting the collection of dues by having a common form for chapter and Society dues;

- Investigating the possibility of a job exchange at annual meetings, thereby encouraging greater involvement of students; and

- Coordinating and maintaining a speakers bureau to give chapters access to nationally known speakers.

East Tennessee Chapter

The East Tennessee Chapter held four meetings during the last quarter of 1992. In August the chapter's annual "Risk Methods Day" featured five speakers from the local risk assessment community. They addressed various aspects of risk assessment methodologies. The September meeting

featured a talk on "Risk Coefficients for Radon," presented by P. J. Walsh, H & R Technical Associates Inc. The guest speaker at the November meeting was David B. McCallum, deputy director of the Center for Risk Communication at Columbia University and SRA Councilor, whose presentation was titled "Risk Communication about Toxics in the Environment." In December the chapter met at a holiday open house hosted by Jan Borkowski, the chapter's past president.

The first chapter meeting of 1993 featured guest speaker John D. Graham, director of the Harvard School of Public Health Center for Risk Analysis and SRA Councilor, whose talk was titled "Toward Optimal Investment in Life-Saving."

Upcoming presentations will address topics such as future directions in risk management, process risk analysis, risk communication, and new developments in risk methodologies. In developing meeting topics, the chapter intends to provide a balance between ecological, human health, and engineering risk analysis issues. The 1993 Risk Methods Day will be held in late spring and will highlight risk-related computer software.

The current chapter officers are: President Joe Minarick, Science Applications International Corporation; Treasurer Roy Hardwick, H & R Technical Associates Inc.; and Secretary Jean MacInnis, Oak Ridge National Laboratory.

New England Chapter

The New England Chapter, with the Boston Risk Assessment Group, has scheduled monthly meetings from January through May. SRA members visiting in the Boston area are invited to attend the chapter meetings, which are usually held at the Massachusetts Institute of Technology, Building E-40, Room 212, at 4:00 p.m.

The topics presented at the January meeting were "Sex Biases in Risk Assessment," by Harlee Strauss of H. Strauss Associates Inc., and "Improved Framework for Uncertainty Analysis: Accounting for Unsuspected Errors," by Alex Shlyakhter of Harvard University. In February, Peter Valberg of Gradient Corporation spoke on "Electromagnetic Field Health Risk: Red Flag or Red Herring," and Paul Locke from the Office of Research and Standards in the Massachusetts Department of Environmental Protection presented "Changes in Risk Assessment Under the New Massachusetts Contingency Plan." In the February issue of

the chapter's newsletter, editor Harlee Strauss wrote that the proposed regulations for the revision of the contingency plan are now available "and contain a lot of material of interest to risk assessment folks." The proposed regulations can be obtained by calling (617) 292-5820.

On March 17, the chapter will hear presentations by Peter Sandman of Rutgers University, who will address the topic "Accountability in Outrage Reduction: The Missing Response in Risk Controversies," and Dorothy Patton of the U.S. EPA Risk Assessment Forum, who will speak on Forum activities.

The chapter will sponsor a half-day workshop on April 7 to examine the policy questions raised by a health risk assessment using the medium of a simulated public hearing on the siting of a municipal waste incinerator in a town meeting setting. Alan Eschenroeder of Alanova, who is the chapter's president-elect, organized the two-part workshop. The public hearing will be enacted first, with John Goodrich and John Caswell, both former town officers from Lincoln, Maryland, playing the members of the town board; Ned Holstein of Environmental Health Associates in the role of the risk assessor and presenter; and several chapter members, including Charlie Menzie, Harlee Strauss, Marilyn Lourandos, Julie Brody, and Janet Keating.

In the second part of the workshop, a panel of specialists experienced in risk communication, mediation for dispute resolution, and environmental law will discuss how the process portrayed at the mock hearing might be facilitated. The panelists are Susan Santos of Focus Group and Columbia University Center for Risk Communication, Larry Susskind of the Massachusetts Institute of Technology Department of Urban Studies and Planning, and Steven Broiles of the Environmental Law Department of Heller, Ehrman, White & McAuliffe, Los Angeles, California.

On May 12 the topic of the chapter meeting is the re-analysis of the soil ingestion data. One of the speakers is Edward J. Calabrese of the University of Massachusetts at Amherst, who is coeditor of the book *Performing Ecological Risk Assessments*, which will be published in September 1993.

Ohio Chapter

The Ohio Chapter sponsored its third exhibition of risk analysis-related software and databases at the SRA 1992 Annual

Meeting in San Diego. Riskware '92 was the second exhibition that the chapter has sponsored for an SRA annual meeting. From the input that the chapter has received, the exhibition was well received. A review article of Riskware '92 is being planned for publication in *Risk Analysis*.

The software programs presented at Riskware '92 are described in the booklet *Softstracts*. To receive a copy of *Softstracts*, call Ron Marnicio at (614) 761-2008 or Steve Lutkenhoff at (513) 569-7531.

The chapter will begin planning Riskware '93 in the near future and welcomes comments and suggestions from SRA members (contact Marnicio or Lutkenhoff).

SRA President Jim Wilson will be the featured speaker at the March 5 chapter meeting. The chapter has selected topics for other meetings in 1993, including threshold limit values in risk analysis and the use of biomarkers of exposure and toxicity in the risk assessment process.

The new president of the Ohio Chapter is Michael L. Dourson, who may be contacted at the U.S. Environmental Protection Agency, Environmental Criteria and Assessment Office, Mail Stop 190, 26 West Martin Luther King Drive, Cincinnati, Ohio 45268, fax (513) 569-7916. The other officers are President-elect Jon Reid, University of Cincinnati Medical Center; Secretary Hallie J. Serazin, Ebasco Environmental; and Treasurer Steven D. Lutkenhoff, U.S. Environmental Protection Agency, Environmental Criteria and Assessment Office. The chapter councilors are Debbie Gray, Metcalf and Eddy; Bert Hakkinen, Procter & Gamble Company; Rick Hertzberg, U.S. Environmental Protection Agency, Methods Evaluation & Development Branch; and Ronald J. Marnicio, Ebasco Environmental.

Research Triangle Chapter

The Research Triangle Chapter will be the host chapter for the 1993 SRA Annual Meeting, which will be held December 5-8 at the Hyatt Regency in Savannah, Georgia. The chapter will help put together the meeting's technical program by reviewing the abstracts and organizing them into technical sessions. Chapter Secretary Bob Hetes of the Research Triangle Institute's Center for Environmental Analysis has been named Annual Meeting Program Chairman. Members of the Research Triangle Chapter who would like to help plan the annual meeting should call Hetes at (919) 541-5995.

"Exposure Assessment" is the topic selected for the chapter's annual fall work-

shop in 1993. Chapter Councilor Annie Jarabek of the U.S. EPA Environmental Criteria and Assessment Office has volunteered to chair the workshop committee. She requests that volunteers willing to serve on the committee call her at (919) 541-4847.

At the November chapter meeting, Craig Armstrong of Dames and Moore spoke on the topic "Public Health Impact Evaluation for Episodic Chemical Releases." The chapter met again on February 24 at the Chemical Industry Institute of Toxicology Conference Room to hear William Desvousges of the Research Triangle Institute speak on "Natural Resource Damage Assessments: A Perspective on Recent Oil Spill Experiences."

Harvey Richmond of the U.S. EPA is the editor of the chapter newsletter "Risk Notes." Information for the chapter newsletter should be sent to RTCSRA, P.O. Box 13753, Research Triangle Park, North Carolina 27709, Attn: Harvey Richmond, Newsletter Editor.

Philadelphia Chapter

The January meeting of the Philadelphia Chapter was held at the Faculty Club of the University of Pennsylvania. The featured speaker, Frederick Talcott from the U.S. Environmental Protection Agency Office of Policy Planning and Evaluation in Washington, D.C., presented the topic "Incorporating Uncertainties into EPA's Risk Decision-Making Process." Talcott dealt specifically with the variability and uncertainty associated with different input values in the risk estimate equation and also presented recommendations on how uncertainties can be displayed, understood, and incorporated into policy and risk management decisions.

The chapter and the University of Pennsylvania Institute for Environmental Studies will co-sponsor two symposia on May 14, 1993, as part of the commencement activities at the University of Pennsylvania. The symposia will be part of a series of Alumni-Faculty Exchanges sponsored by the president of the university. The topic of the first symposium is "Lead

U.S. Chapter Contacts

Columbia-Cascades: Jim Dukelow (president), (509) 376-7074.
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 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: Doug Kononen (president), (313) 986-1351.
 National Capital Area: Rebecca Klemm (secretary), (202) 667-5244.
 New England: Charlie Menzie (president), (508) 453-4300.
 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.

and Mercury: How Can We Reduce the Risks to Our Children?" The speakers will be Herbert Needleman, Irving Shapiro, and Lucy Hackney, all from the University of Pennsylvania. The second symposium is titled "Is There Really a Risk in Global Warming?" and will feature speakers Robert F. Gugenbach and Mark Bernstein, both from the University of Pennsylvania. Admission is open to the public and free of charge.

Greater Pittsburgh Chapter

The Greater Pittsburgh Chapter is currently holding its 1993 elections for the offices of president-elect, treasurer, and one councilor. The other officers are: President Vincent Arena of the Department of Biostatistics at the Graduate School of Public Health, University of Pittsburgh; Secretary David Pipozar of the Allegheny County Health Department; Councilor Jeanette Trauth of the Graduate School of Public Health, University of Pittsburgh, and Councilor James Mudge of SE Technologies, Inc.

The next meeting of the Greater Pittsburgh Chapter of SRA is being co-sponsored by the Pittsburgh Chapter of the Health Physics Society and the Pittsburgh Chapter of the American Society for Public Administration. The topic of the meeting is "Pennsylvania's Low-Level Radioactive Waste Siting Program." The speakers are William Dornseif of the Pennsylvania Department of Environmental Resources and Bernard Cohen of the Department of Physics at the University of Pittsburgh. The meeting will be held at 6:30 p.m. March 4, 1993, at the Graduate School of Public Health, University of Pittsburgh.

1992-93 Roster of SRA Officers and Councilors

President: James D. Wilson, Monsanto Company, 800 N. Lindbergh Boulevard, St. Louis, MO 63167, telephone (314) 694-8879, fax (314) 694-8808.

President-elect: Robert G. Tardiff, Health Sciences Group, EA Engineering, Science and Technology Inc., 1423 Trapline Court, Vienna, VA 22182-1731, telephone (703) 893-7475, fax (703) 893-3737.

Secretary: Vlasta Molak, Gaia Unlimited Inc., 8987 Cotillion Drive, Cincinnati, OH 45231, telephone or fax (513) 521-0506, e-mail: usr1789a@cbois.uc.edu.

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Past President: D. Warner North, Decision Focus Inc., Suite 300, 650 Castro Street, Mountain View, CA 94041-2055, tele-

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Executive Secretary: Richard J. Burk Jr., Suite 130, 8000 Westpark Drive, McLean, VA 22102, telephone (703) 790-1745, fax (703) 790-9063.

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Councilor, 1993: Saburo Ikeda, Institute of Socio-Economic Planning, The University of Tsukuba, 1-1-1 Tennoudai, Tsukuba, Ibaraki 305, Japan, telephone 81-0298-53-5380, fax 81-0298-55-3849, e-mail: ikeda@shako.sk.tsukuba.ac.jp.

Councilor, 1993: David B. McCallum, Columbia University, Center for Risk Communication, 1000 Potomac Street, N.W., Washington, D.C. 20007, telephone (202) 338-2156, fax (202) 338-2159.

Councilor, 1994: Donald G. Barnes, Science Advisory Board (A-101), U.S. Environmental Protection Agency, Washington, D.C. 20460, telephone (202) 260-4126, fax (202) 260-9232, e-mail: barnes.don@epamail.epa.gov.

Councilor, 1994: John D. Graham, Harvard Center for Risk Analysis, Harvard School of Public Health, 677 Huntington Avenue, Boston, MA 02115, telephone (617) 432-4343, fax (617) 432-2494.

Councilor, 1994: Rae Zimmerman, New York University, Robert F. Wagner Graduate School of Public Service, 4 Washington Square North, New York, NY 10003, telephone (212) 998-7432, fax (212) 995-3890.

Councilor, 1995: Vicki M. Bier, University of Wisconsin, Department of Industrial Engineering, 1513 University Avenue, Madison, WI 53706, telephone (608) 262-2064, fax (608) 262-8454, e-mail: bier@ie.engr.wisc.edu.

Councilor, 1995: Thomas A. Burke, The Johns Hopkins University, 624 N. Broadway, Baltimore, MD 21205-1995, telephone (410) 955-1604, fax (410) 955-0876.

Councilor, 1995: Ray Kemp, Dames & Moore International, Booth House, 15-17 Church Street, Twickenham, TW1 3NJ, United Kingdom, telephone 44 81 891 6161, fax 44 81 891 4457, telex 929861.

SRA-Europe

President: Marc Poumadère, Institut SYMLOG, B.P. 125, 94230 - Cachan, France, telephone 33 1 4540 0990, fax 33 1 4740 8258.

Past President: R. A. (Tony) Cox, Four Elements Ltd., Greencoat House, Francis Street, London SW1P 1DH, U.K., telephone number 71 973 8041, fax 71 973 8042, e-mail: fourelements@cix.compulink.co.uk.

SRA-Japan

President: Tomio Kinoshita, Professor and Dean, Integrated Human Studies, Kyoto University, Yoshida, Sakyo-Ku, Kyoto 606, Japan, telephone 75-753-6501, fax 75-753-6897.

Secretary and Deputy President: Saburo Ikeda (see address under SRA roster, Councilor 1993).

Wilson Appoints 1993 Committee Chairs

SRA President Jim Wilson has asked the following SRA members to chair committees and serve the Society in other positions during 1993:*

Standing Committees

Annual Meeting: Robert G. Tardiff.

Awards: B. John Garrick (see address on page 16).

Conferences & Workshops: David B. McCallum.

Executive: James D. Wilson.

Finance: Raymond F. Boykin.

Meetings: Robert G. Tardiff.

Nominating: Curtis C. Travis (see address on page 5).

Publications: D. Warner North.

Sections and Chapters: Rae Zimmerman.

Other Committees Established by the Council

Gifts and Grants: Elizabeth L. Anderson, Clement International Corporation, 9300 Lee Highway, Fairfax, VA 22031, telephone (703) 934-3500, fax (703) 934-3278.

Membership: Thomas A. Burke.

Ad Hoc Work Groups

Residential Exposure Assessment Project: Jeff Driver, Bert Hakkinen, David McCallum, and Gary Whitmyer.

Future Structuring of Society: James D. Wilson; R.A. (Tony) Cox, and Saburo Ikeda.

Improving Input to Governmental Units: Ann N. Fisher.

Other Positions

Historian: Vincent T. Covello, Center for Risk Communication, Columbia University, School of Public Health, 60 Haven Avenue, New York, NY 10032, telephone (212) 305-3464, fax (212) 749-3590.

Legal Counsel: Peter Barton Hutt, Covington & Burling, 1201 Pennsylvania Avenue, N.W., Washington, D.C. 20004, telephone (202) 662-5522, fax (202) 662-6291.

*Addresses not provided in this list may be found in the roster of officers and councilors.

1993 SRA Annual Meeting To Have Seven Tracks

Organizers of the 1993 SRA Annual Meeting are expanding the meeting's format to seven concurrent tracks.

They are establishing a human health effects track in addition to the six 1992 tracks, which focused on environmental/global risk, risk communication, engineering and space applications, exposure assessment, dose response methodology, and regulatory policy/decision making.

The 1993 Annual Meeting, which will be held December 5-8 in Savannah, Georgia, also will include workshops, said Bob Hetes, one of three co-chairs of the Technical Program Committee. The committee is organizing

the meeting under the direction of President-elect Robert Tardiff.

"We are planning a special session or workshop on quantitative methods, and we're discussing other workshops," Hetes said. "If people have any ideas, we'd like for them to contact us."

Members interested in assisting with the meeting can contact Hetes of the Research Triangle Institute's Center for Environmental Analysis in North Carolina at (919) 541-5995. The other committee co-chairs are Annie Jarabek of the U.S. Environmental Protection Agency in Research Triangle Park, telephone (919) 541-4847, and Deborah Amaral of the University of North Carolina at Chapel Hill, telephone (919) 966-6691.

Uniting Cultures

(Continued from page 21.)

America was transported to a country with a different material and technological culture. The recipients contextualized the alien technology into their lives according to their own cultural necessities and presuppositions. Workers inside the plant, for example, developed their own ways of dealing with the constant malfunctions in valve and alarm systems: they relied on their sense of smell to detect the acrid presence of methyl isocyanate.

In the third area of contingency, what we claim to know about risk and how we interpret information are contingent on contextual factors, ranging from individual experience to national political culture. Knowledge about risk is constructed in different ways in different political and cultural settings.

Countries as similar as the United States and Britain, for example, differ markedly in the kinds of information they deem necessary to establish the existence of an actionable risk. Because the British value physical observations more highly than theoretical models, scientists in England acknowledged the need to ban CFCs much more readily after the discovery of the ozone hole than on the basis of predictions made by American atmospheric chemists.

I would like to conclude by asking you to consider how the insights drawn from social, political, and ethical studies of risk can be used to improve the methods of conducting risk assessment as well as communicating about risk. My general point is that qualitative research can help to illuminate the blind spots in established approaches to risk assessment. Qualitative studies can make us rethink many of the truisms that we so readily accept about risk. In particular, such research can make explicit the key variables of scale and interactivity that quantitative assessments may have overlooked in their effort to reduce the world to manageable proportions.

I hope I have succeeded today in conveying some of the excitement and possibilities that still lie ahead in the field of risk analysis.

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Four copies of a summary (800-1,200 words, typed, single-spaced) should be submitted to the Technical Program Chairman no later than May 13, 1993. *Summaries will contain a title and include all authors' names, affiliations, and telephone and fax numbers.* Mail summaries to the Technical Program Chairman:

Professor George Apostolakis
Mechanical, Aerospace, and Nucl. Eng. Dept.
38-137 Engineering IV
University of California
Los Angeles, CA 90024-1597 USA
Telephone (310) 825-1300, fax (310) 206-2302

Risk-Related Happenings

Satellite Training Aairs

Two video-conference training series are now available through the University of New Mexico and the Waste-management Education and Research Consortium.

Any facility with a satellite dish in the United States can receive the series. The live broadcasts provide cost-effective, on-site training for organizations such as government contractors and universities.

"Environmental Risk Management: Bridging the Gap Between Technical Issues and Social Concerns" is a seven-part series that addresses environmental risk communication scenarios. It began on February 10 and will be offered once a month on Wednesdays, with a two-month break in the summer. SRA member Lynn Anspaugh of Lawrence Livermore National Laboratory is one of the program leaders for the session airing March 10 titled "Technical and Social Methods for Identifying Risk." SRA member Hank C. Jenkins-Smith, who is on the faculty of the University of New Mexico Department of Political Science, is a technical advisor for the series.

"Radioactive Waste Management" is an eight-part series beginning March 3 and running concurrently on alternating Wednesdays with the risk management series. Starting with a general review of radioactivity and health physics,

the series will discuss major national programs associated with radioactive waste management and disposal, such as uranium mill tailings and transuranic wastes. The final program addresses new technologies under development.

Both broadcasts can be purchased as complete series or as individual programs for group viewing at a site or for individual viewing. For more information, contact Connie Callan, WERC Manager for Continuing Education, telephone 1-800-292-7051 (toll free) or (505) 277-7750 if calling from New Mexico and/or overseas, fax (505) 277-7833.

Radiation Council Meeting in April

The National Council on Radiation Protection and Measurements will hold its 1993 Annual Meeting April 7-8 at the Crystal City Marriott in Arlington, Virginia.

SRA members Paul Slovic and Chris Whipple helped develop the scientific program for the meeting, along with Leonard Sagan, William Hendee, and Dade Moeller.

Presentations include "Radiation 'Science' in the Courtroom" and "Risk Perception, Trust, and Democracy," as well as case studies on indoor radon and regulatory concern.

For more information, contact Executive Director Roger Ney at the Council's headquarters in Bethesda, Maryland, telephone (301) 657-2652.

Calendar of Events

April 5-8. **THE RISK ASSESSMENT PARADIGM AFTER 10 YEARS: POLICY AND PRACTICE THEN, NOW AND IN THE FUTURE**, Hope Hotel and Conference Center, Wright-Patterson Air Force Base, Dayton, Ohio. The interagency conference's goal is to acquaint individuals with the basics of the risk assessment process as originally developed 10 years ago by the National Academy of Sciences; to highlight current issues in risk assessment, emphasizing strengths and weaknesses of the current paradigm and areas needing change; and to present and discuss current research related to improving the risk assessment process. For more information, contact Lois Doncaster, Conference Coordinator, ManTech Environmental Technology Inc., P.O. Box 31009, Dayton, Ohio 45437-0009, telephone (513) 256-3600 ext. 212.

April 22-23. **FIRST BIENNIAL CANADIAN CONFERENCE ON PROCESS SAFETY AND LOSS MANAGEMENT**, Centre Suite Hotel, Edmonton Eaton Centre, Edmonton, Alberta, Canada. The conference's goal is to document innovative risk-based approaches to process safety in Canada and also to improve knowledge and process safety. Organizers are the University of Alberta, the Institute for Risk Research, and the Major Industrial Accidents Council of Canada. Post conference plant tours will be available on April 24. For more information, contact Diana del Bel Belluz, PSLM Conference Secretariat, Institute for Risk Research, University of Waterloo, Waterloo, Ontario, Canada N2L 3G1, telephone (519) 885-1211 ext. 5136, fax (519) 888-6197.

April 26-27. **THE BIOLOGICAL EFFECTS OF LOW LEVEL EXPOSURES (BELLE) TO CHEMICALS AND RADIATION**,

Crystal Gateway Marriott Hotel, Arlington, Virginia. The program consists of three sessions on changing scientific paradigms, low-level exposure to chemical agents and modulation of toxic effects, and biological responses to low doses of radiation. Several SRA members are among the speakers. For information contact Linda Baldwin, School of Public Health, N344 Morrill Science Center, University of Massachusetts, Amherst, MA 01003, telephone (413) 545-1239, fax (413) 545-4692.

May 3-6. **INTERNATIONAL CONGRESS ON THE HEALTH EFFECTS OF HAZARDOUS WASTE**, Marriott Marquis Hotel, Atlanta, Georgia. Sponsors are the U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry. The conference's purpose is to promote the exchange of findings, ideas, and recommendations related to the human health effects of hazardous waste. Deadline for early registration is April 5, and hotel registration deadline for group rates is April 12. For more information, contact Howard Frumkin, Emory University School of Public Health, Division of Environmental and Occupational Health, International Congress on the Health Effects of Hazardous Waste, 1599 Clifton Road N.E., Atlanta, Georgia 30329, telephone (404) 727-3697, fax (404) 727-8744.

May 7. **JOINT MEETING OF INTERNATIONAL SOCIETY FOR ENVIRONMENTAL EPIDEMIOLOGY AND INTERNATIONAL SOCIETY FOR EXPOSURE ANALYSIS**, Marriott Marquis Hotel, Atlanta, Georgia. Meeting will be held following the International Congress listed above.

(Continued on page 27.)

Positions Available

Environmental Risk Assessment Research Scientist/Policy Analyst School of Public and Environmental Affairs Center for Urban Policy and the Environment Indiana University — Indianapolis Campus

Professional staff person to perform environmental risk assessment, including ecological and health risk assessment. Preparation of reports. Masters degree in Environmental Science, Toxicology, Environmental Engineering, or related scientific discipline. Position requires 3-5 years general experience with specific experience in assessing the risk from a broad range of pollutants in all media (air, water, land), and demonstrated knowledge of EPA risk assessment guidelines. Position is for pollutant risk assessment, not health and safety. Send resume and scientific writing sample to:

Marcia Combs
Human Resources Administration
620 Union Drive
Indiana University—Purdue University
Indianapolis, IN 46202

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Tenure-Track Faculty Position in Biostatistics Tulane University School of Public Health and Tropical Medicine

The Department of Biostatistics and Epidemiology is seeking a biostatistician for tenure-track position in the Department of Biostatistics and Epidemiology. Duties will include teaching and collaborating in multidisciplinary research of environmental health effects.

A doctorate in biostatistics, statistics or a related field and a commitment to environmental research are required. Salary and rank commensurate with experience. Closing date for applications is March 15, 1993. Applicants are asked to send a curriculum vitae and three letters of reference to: Janet M. Hughes, Ph.D., Search Committee Chair, Tulane School of Public Health and Tropical Medicine, 1430 Tulane Avenue, New Orleans, LA 70112.

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Calendar of Events

(Continued from page 26.)

June 25. SRA-JAPAN SPRING ANNUAL MEETING & WORKSHOP, Sanzyo Hall, the University of Tokyo, Japan. Topic of the meeting is "Approaches Toward Risk Analysis." (See article on page 10.)

October 18-20. FOURTH ANNUAL CONFERENCE OF SRA-EUROPE, Rome, Italy. Conference theme is "European Technology and Experience in Safety Analysis and Risk Management 10 Years After the Seveso Directive." Session topics are emerging trends in European safety analysis and risk management, risk analysis aiding decision making in industry, risk analysis aiding decision making in governments, risk communication principles and experiences, quality management, safety management, and insurance. Full papers will be published in conference proceedings distributed at meeting. For more information, contact Paolo Vestrucci, N.I.E.R., Via S. Stefano 16, 40125 Bologna, Italy, telephone 39 51 239728, fax 39 51 227824.

November 12-16. THE OXYGEN SOCIETY ANNUAL MEETING, Omni Hotel, Charleston, South Carolina. For more information contact The Oxygen Society, Suite 130, 8000 Westpark Drive, McLean, VA 22102, telephone (703) 790-1745, fax (703) 790-9063.

November 26-27. SRA-JAPAN SIXTH ANNUAL MEETING AND SYMPOSIUM, Tokyo, Japan. Main theme is "Informed Consent and Risk Communication." (See article on page 10.)

December 5-8. SRA ANNUAL MEETING, Hyatt Regency Savannah, Savannah, Georgia.

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Hygiene Board Awards Points

The American Board of Industrial Hygiene has awarded the SRA 1992 Annual Meeting held December 6-9 one-half a CM point per each half day attended. The CM approval number for the meeting is 430. CM points are accrued by Certified Industrial Hygienists who are certified by the American Board of Industrial Hygiene.



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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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The Other Side of Success

A call we received last week from someone who is not an SRA member but is engaged in risk analysis affirmed to some degree that RISK newsletter is indeed accomplishing one of its goals. Not ever having seen a copy of the newsletter, she said she had heard that it was *the* networking system for risk analysts.

Providing a network, of course, has been our intention, and that is why you find in this newsletter, as in our previous issues, so many names and addresses of persons we know to be engaged in risk analysis and risk management. The reason some of the lists are weighted toward foreign countries is because we met many of these individuals at the December SRA Annual Meeting in San Diego and, sensing the urgency with which they are approaching their own national problems, we are convinced that they and their counterparts in the United States can mutually benefit from increased collaboration on programs of common interest.

Alas, our zeal in acting as a network and covering news stories both within and outside the Society has a downside. The costs associated with publishing a newsletter this size are not easily borne by a organization with only 2,000 members, and, in fact, they have *not* been entirely borne by the Society. Moreover, actions at the last annual meeting to strengthen SRA-Europe will result in a transfer of some memberships from the international SRA to SRA-Europe, with a concomitant decrease in the payment of dues to the international Society.

The implications of an underfunded RISK newsletter are obvious. We will either be forced to reduce our efforts—in spite of burgeoning risk-related news—or we must find additional support, such as grants or sponsors. We solicit your help in confronting this problem.

—Lorraine S. Abbott

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