

# RISK *newsletter*

Published by the SOCIETY for RISK ANALYSIS

Volume 15, Number 4

Fourth Quarter 1995

## **Five Workshops at Annual Meeting**

*The growing popularity and prominence of risk analysis further accentuates the need for providing our Society for Risk Analysis membership and the professional community at large with access to experts in the various fields of risk analysis. This year, SRA is offering five workshops at the annual meeting that transcend diverse topics and span the expertise of several disciplines.—Yacov Y. Haimes, Chair, SRA Meetings and Workshops Committee*

The 1995 SRA Annual Meeting in Honolulu will begin on Sunday, December 4, at 8:00 a.m. with five workshops. Preregistration fees are \$200–\$250 (full day) and \$100 (half day).

**Geographic Information Systems (GIS) Applications in Hazard Assessment and Management** (full day), *organized by Srinivas Emani, Clark University.* The problems of hazardous waste site characterization, surface and groundwater contamination analysis, noxious facility siting, and assessing the social and economic impacts of natural hazards have all applied Geographic Information Systems technology. This workshop will introduce GIS applications in hazard assessment and management by describing the basic concepts of GIS and illustrating its use through case studies on hazardous waste site characterization and facility siting. It will also demonstrate emerging tools in GIS to facilitate public participation in risk management.

**Quantitative Techniques for Analysis of Variability and Uncertainty in Exposure and Risk Assessment** (half day), *organized by H. Christopher Frey, North Carolina State University, and David E. Burmaster, Alceon Corporation.* The workshop will offer a tutorial on practical methods for dealing with variability and uncertainty in exposure and risk assessment. In traditional approaches to probabilistic analysis, distributions for both variable and uncertain inputs are often propagated through an exposure and risk model in the same dimension of uncertainty. The model output thus represents a hybrid distribution which contains some combination of true variability and uncertainty reflecting a lack of knowledge. Such a distribution can lead to erroneous inferences if the result is misinterpreted. This workshop will seek to improve understanding of the situations in which a disaggregated treatment of variability and uncertainty is appropriate and present practical methods for dealing with related issues.

**Risk Communication and Public Involvement** (full day), *organized by Steven C. Lewis, Exxon Biomedical Sciences, Inc., and Alvin Chun and Arnold Den, U.S. Environmental Protection Agency.* In dealing with publicly charged environmental health issues such as land use proposals and the cleanup of a contaminated site, the critical issues of gaining public understanding and public acceptance are often overlooked. This workshop will provide practical tools for understanding and addressing concerned communities or angry citizens and will give participants some practice in planning for effective public communication and participation. It will include actual case studies, video examples, and facilitated discussions.

*(Continued on page 3.)*

## **Yokoyama, Morgan Are Plenary Speakers**

In keeping with the meeting theme, "Learning from Cross-Cultural Comparison," the opening plenary session of the joint annual meeting of the Society for Risk Analysis and the Japan Section of SRA will feature addresses by Society members from opposite sides of the Pacific Ocean—Dr. Eiji Yokoyama of Japan and Professor M. Granger Morgan of the United States.

Dr. Yokoyama is the recently retired director general of Japan's National Institute of Public Health and is currently president of the Japan Society for Atmospheric Environment. He has been a member of SRA since 1986 and was president of the Japan Section from 1990 to 1992. The topic of his plenary address will be "Health Risk Assessment in Japan."

Dr. Yokoyama graduated from the University of Tokyo School of Medicine in 1954, continuing his association with the university's hospital for five years as a respiratory clinician. He then joined the research staff of the National Institute of Public Health, becoming the institute's director general in 1993.

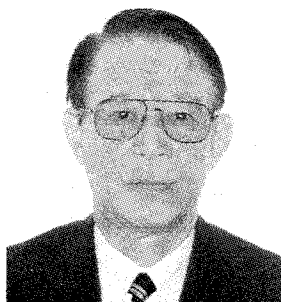
During his years at the institute, Dr. Yokoyama focused on the evaluation of health effects caused by air pollution, especially the physiological effects of nitrogen dioxide and photochemical oxidants. He also performed similar research in the United States—first as a research fellow at the Department of Physiology in the School of Public Health at Harvard University (1963–1965) and later as a visiting scientist at the Department of Environmental Health of the School of Public Health and Community Medicine at the University of Washington (1970–1971). For his numerous research contributions, he was presented the Award of the Japan Society of Air Pollution in 1986.

*(Continued on page 2.)*

*This newsletter is printed on recycled paper.*

## Plenary Speakers (Continued from page 1.)

Dr. Yokoyama has also been active in ensuring practical applications of research results, both his and others, within Japan. He was a member of the expert committee that established Japan's National Ambient Air Quality Standards for nitrogen dioxide and photochemical oxidants in 1973, helping to revise the former in 1978. He also helped revise Japan's Pollution-related Health Damage Compensation Law in 1988 and served as an appointed member of Japan's Central Council for Environmental Pollution Control from 1982 to 1989. In addition,



Eiji Yokoyama

he participated in two workshops (in 1992 and 1993) on Risk Assessment and Management of Toxic Chemicals that were sponsored by the U.S. Environmental Protection Agency and the Japan National Institute for Environmental Studies. More recently, in 1994-1995, he chaired a special committee organized by the Environmental Agency, Japan, for reviewing the countermeasures in the risk-based approach for controlling hazardous air pollutants.

The second plenary speaker, M. Granger Morgan of Carnegie Mellon University, will speak on "Risk Analysis: A Personal Assessment of the State of the Field." He will review the progress the field has made over the past two decades, offer his personal assessment of how professionals in the field have done, and discuss some of the issues that he believes need attention in the future. He is the recipient of SRA's 1995 Distinguished Achievement Award (see below).

## M. Granger Morgan Named Recipient Of SRA's 1995 Distinguished Achievement Award

M. Granger Morgan, a charter member and fellow of SRA, will be presented the Society's 1995 Distinguished Achievement Award on December 4 during the opening plenary session of the SRA Annual Meeting in Honolulu.

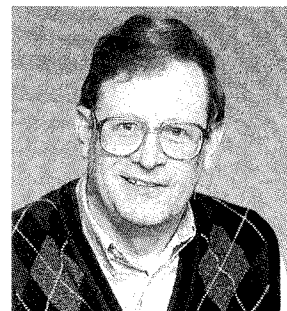
Morgan is department head and professor in the Department of Engineering and Public Policy at Carnegie Mellon University, where he also has academic appointments in the Department of Electrical and Computer Engineering and in The H. John Heinz III School of Public Policy and Management.

In announcing the SRA award, Awards Committee Chairman D. Warner North said that Morgan's selection was based on his work on a variety of problems in risk analysis, risk management, and risk communication, particularly as they involve policy problems in which technical and scientific issues play a central role. He was also cited for his contributions as an educator, especially his supervision of many Ph.D. theses in engineering and public policy. In 1989, he was awarded the Carnegie Mellon University Robert Doherty Prize Award for "substantial and sustained contributions to excellence in education."

Morgan completed his undergraduate studies at Harvard College in 1963, where he concentrated in physics and graduated with honors in general studies. In 1965, he received an M.S. degree from Cornell University in astronomy and space science, for which he performed experimental studies of the ionosphere on the 1000-foot telescope in Arecibo, Puerto Rico. After an interlude of graduate studies in history and the social sciences at the University of California at Berkeley, he earned a Ph.D. degree in 1969 from the Department of Applied Physics and Information Sciences at the University of California at San Diego, for which he did experimental studies of radio star scintillation. His association with the University of California at San Diego continued through 1972, where he filled the dual roles of director of a vocational program in computers for disadvantaged persons and lecturer/assistant professor in the Department of Applied Physics and Informa-

tion Science. He joined Carnegie Mellon in 1974 following two years at the National Science Foundation, where he became director of the Division of Computer Research.

His current interests include problems in the integrated analysis of large complex systems and problems in the characterization and treatment of uncertainty. He is involved in a large program of integrated assessment of global climate change, his own research focusing on multi-attribute, multi-actor framings of the issues and the treatment of mixed levels of uncertainty in assessment models. Previous work in this program has been described in two journal articles that he coauthored with H. Dowlatabadi and D. W. Keith, respectively: "A Model Framework for Integrated Studies of the Climate Problem," *Energy Policy*, 21(3), 1993; and "Subjective Judgments by Climate Experts," *Environmental Science & Technology*, 29(10), 1995. His earlier work on treating uncertainties is described in the book *Uncertainty: A guide to dealing with uncertainty in quantitative risk and policy analysis* (Cambridge University Press, New York, 1990), which he coauthored with colleague Max Henrion.



M. Granger Morgan

He is also currently working on the development of methods of risk ranking to support decision making in risk management organizations, such as federal agencies; and, with Baruch Fischhoff and Lester Lave, he has developed a mental model based approach to risk communication.

In earlier research, he has addressed numerous other issues, including possible health risks from chronic exposure to power-frequency electric and magnetic fields, health and environmental impacts of energy systems, air pollution monitoring, the impact of computers and telecommunications, and communicating risks to the public.

**Workshops** (Continued from page 1.)

**Risk of Extreme Events** (half day), organized by Yacov Y. Haimes and James H. Lambert, University of Virginia. In risk assessment, extreme and catastrophic events are often underestimated in comparison with less consequential events. Risk managers and decision makers often focus on the risk associated with a specific case instead of the likelihood of average outcomes which may result from various risk situations. As a result, the expected value of risk is not only inadequate but also can lead to fallacious results and interpretations if it is used as the sole risk index. This workshop will show how using conditional expectation to modify this approach is better for assessing the risk of extreme and catastrophic events. It will focus on the importance of addressing extreme and catastrophic events explicitly and within the overall risk-based decision-making process, and will include a hands-on application of extreme-event analysis.

**Uncertainty Propagation with Interval Analysis and Fuzzy Arithmetic** (full day), organized by Scott D. Ferson, Applied Biomathematics. Interval analysis and fuzzy arithmetic for propagating uncertainty are useful even when data are too sparse for other uncertainty projection methods and for analyzing uncertainty of all kinds, no matter what its nature or source. Interval analysis underlies any reasonable conception of worst case analysis or theoretical upper bound estimates and can also provide an often simple check on the results of a full-blown probabilistic risk analysis. This workshop will review the use of interval analysis and fuzzy arithmetic for propagating uncertainty through mathematical calculations, including some important subtle details in using the methods that are commonly overlooked in risk analysis and can lead to seriously erroneous conclusions.

## Graham Assumes SRA Presidency

When incoming SRA President John D. Graham accepts the gavel from outgoing President M. Elisabeth Paté-Cornell at the 1995 SRA Annual Meeting in Honolulu, he will tackle what he terms the "bread and butter" challenges of the Society. These challenges include recruiting new members, targeting fund raising for support, visiting SRA chapters, raising the Society's visibility in the U.S. policy community, and extending the Society's reach internationally.



**John D. Graham**

Another task high on his agenda is promoting new ways of rewarding innovative practitioners of risk analysis, possibly giving occasional awards that recognize outstanding work. He also hopes to stimulate a rigorous evaluation of university-based curricula on risk, as well as discussion on how university-based training can be strengthened. In addition, he wants to broaden SRA's current focus on health risk assessments for chemicals and ionizing radiation to include problems such as non-ionizing radiation, accidents, violence in the home and community, genetic effects, ecological hazards, and dietary and nutritional factors in disease. All these activities will follow his busy year as chair of the 1995 Annual Meeting Committee.

A professor of policy and decision sciences at the Harvard School of Public Health, Graham teaches the methods of risk analysis and benefit-cost analysis. His primary research objective is to distinguish public policies that can save lives and reduce injury or chronic disease at a reasonable cost from those policies that are not cost effective. As a scholar, he is best known for Harvard's "Lifesaving Priorities Project," which produced a computerized data base on the relative costs and effectiveness of 500 lifesaving policies in medicine, injury prevention, and toxin control. His interest in building institutions that respond to urgent societal needs led him to found the Harvard Injury Control Center and the Harvard Center for Risk Analysis, both of which he currently leads.

Graham has been active in influencing the policy-making process, beginning in the 1980s when his early cost-benefit analysis of automobile airbag technology was cited in pro-airbag decisions by both the U.S. Supreme Court and former Secretary of Transportation Elizabeth Dole. Senator Daniel Patrick Moynihan praised him as a pioneer in bringing risk analysis to the Clean Air Act Amendments of 1990, and in 1991 Surgeon General Antonia Novello gave him the "Award for Outstanding Service in Helping to Develop and Support the National Agenda for Injury Control." Since 1994, he has testified at more than ten congressional hearings on the need for better use of risk analysis in federal regulatory decisions. Most recently, he has worked with both senators and representatives on a bipartisan legislative proposal to reform health, safety, and environmental regulation. Over the years he has served on several National Academy of Sciences committees and on advisory committees to other government agencies and corporations.

Graham has a bachelor of arts degree from Wake Forest University and a master of arts degree from Duke University. He completed his Ph.D. in public policy at Carnegie Mellon University in 1983.

**Annual Meeting Program Changes:** Since the publication of the preliminary program for the 1995 SRA Annual Meeting, two cancellations and one addition have been announced: (1) The workshop "Comparative Risk Analysis" scheduled for Sunday has been canceled. (2) The symposium by the U.S. Food and Drug Administration, "Future Directions in Risk Assessment for the Center for Food Safety and Applied Nutrition," scheduled for Wednesday has been canceled. (3) A new symposium, "Computer Software and Data Bases in Support of Risk Analysis in the U.S. and Internationally," has been added for Tuesday, 8:30-10:00 a.m. The chair will be Steven D. Lutkenhoff, U.S. Environmental Protection Agency, Cincinnati, Ohio.

## The Society's Financial Status

(Editor's Note: The following report on the Society's financial status was submitted to RISK newsletter by SRA's Executive Committee.)

Last year at this time the SRA Executive Committee prepared a summary report on the Society's financial condition for the membership. This year we are providing an update of the Society's financial conditions and a brief summary of the financial changes that have occurred over the last twelve months.

Last year we reported that the Society's financial condition was "sound but open for improvement." This year's report is summarized as "movement in the right direction." To help explain the recent trends in SRA's financial status, audited data from fiscal years 1992-1994 were graphed along with budgetary estimates for fiscal year 1995, which ends December 31, 1995. The graphs present information on the major elements that make up our gross revenues and expenses, which, when combined, produce our net revenues. This information has been compiled from the treasurer's reports for the past three fiscal years.

Three graphs are provided: one for revenues, another for expenses, and a third for net revenues. To simplify the graphical presentation, several revenue items were combined from the detailed budget categories tracked in the SRA accounting system; e.g., dues from individual members (including subscription revenues) and sustaining sponsors were combined, and "miscellaneous" herein includes all other revenue sources not specifically identified. Similarly, expense categories were also combined: e.g., officers, councilors, and support were grouped under "Council"; and "miscellaneous" includes all other expense sources not specifically identified.

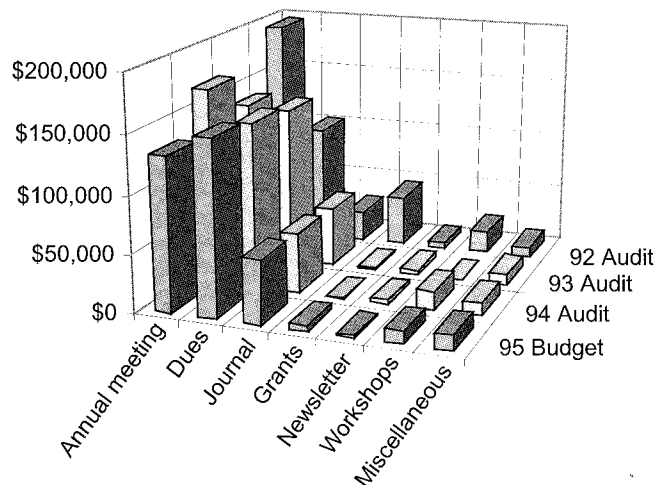
As background, each year several weeks before the Society's annual meeting, the Society's treasurer and executive Secretary develop a proposed budget. This budget is based on established financial commitments, historical experience, and budget requests from various sources (e.g., officers and committee chairs). The proposed budget (including expected net receipts from the annual meeting of the specified fiscal year) is then reviewed, modified when needed, and formally approved by the SRA Council at a meeting that occurs during the annual meeting. Implementation of the approved budget is accomplished by the executive secretary with close oversight from the Society's treasurer and president.

### Gross Revenues

The gross revenues of the Society were \$398,818 in 1992, declined to \$341,982 in 1993, rose to \$399,188 in 1994, and are estimated to be \$368,000 (including expected receipts of the annual meeting) in 1995. Besides these revenues, the Society received \$39,121 in 1993 and \$154,932 in 1994 to fund two projects, one on residential exposure assessment and the second for guidance on Monte Carlo modeling of exposure. These funds are restricted for use on these projects and have not been included in the calculation of the Society's gross revenues, expenses, or net revenues.

The Society's gross revenues are derived principally from the dues of individual members and sustaining sponsors, jour-

### Gross Revenues



nal subscriptions, and the annual meeting. The revenues for the years 1992, 1993, 1994, and the estimated revenues for 1995 are 25%, 40%, 36% and 41% (est.) for dues; 7%, 15%, 13%, and 15% (est.) for journal subscriptions; and 54%, 40%, 47% and 39% (est.) for the annual meeting and workshops. As discussed elsewhere in this newsletter, the Society will be increasing the dues in 1996 and that will increase the relative contribution of dues (see page 12). The proposed increases do not affect the 1995 dues income. The increase in revenues from journal subscriptions after 1992 reflects a change in the contractual relationship with Plenum Publishing Corporation. The revenues from workshops during calendar year 1992 were much greater than those in subsequent years, resulting in the drop in income in 1993.

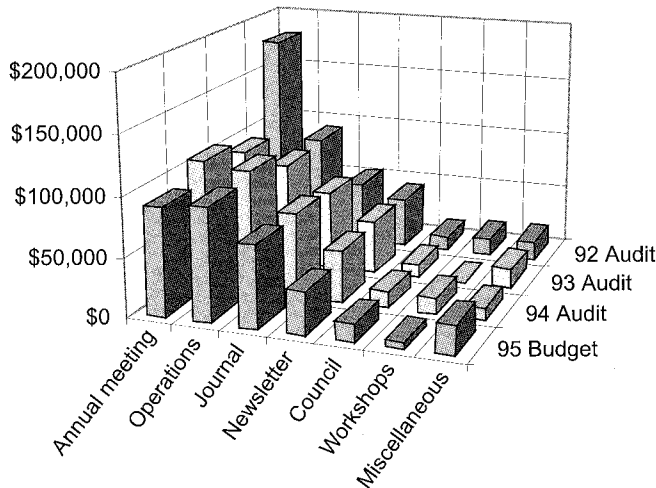
### Expenses

The expenses of the Society were \$406,537 in 1992, declined to \$321,822 in 1993, rose to \$362,657 in 1994, and are estimated to decline to \$335,600 in 1995. The high expenses recorded in fiscal year 1992 were the result of higher costs for the annual meeting and workshops. Increased expenses in 1994 were due to the annual meeting expenses.

The primary sources of the Society's yearly expenses consist of three parts:

- **Management & Operations** provided by the Secretariat (i.e., Burk & Associates Inc.), which includes salaries, salary-based charges, rent, equipment, insurance, bonds, taxes, and other direct costs (e.g., committee operations, organizational support, and Society direct costs such as postage, printing, audit and legal, telephone and duplication), representing for the subject years 29%, 36%, 35%, and 40% (est.), respectively, of the Society's total expenses. The increases in the percentage for management and operations over this period are due to the decrease in other costs to the Society and increases in the Society's direct costs. The Secretariat's management fee accounts for less than two-thirds of the manage-

### Expenses



ment and operations costs and has been relatively constant for the last four years.

- **Publications**, which includes the journal and newsletter; for the subject years, the expenses for the journal are 13%, 21%, 20%, and 21% (est.), respectively, of the total expenditures; the newsletter accounts for 10%, 14%, 12%, and 11% (est.), respectively.

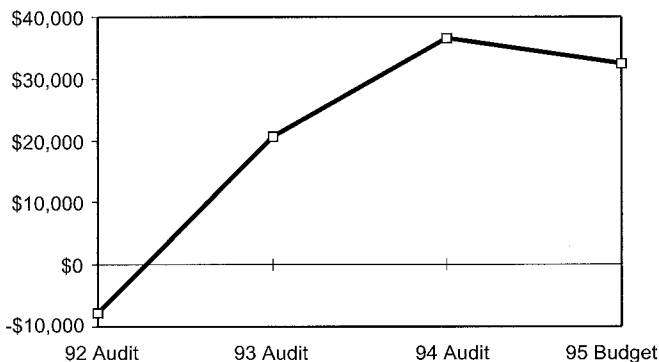
- **Annual Meeting**, expenses for the subject years were 44%, 30%, 30%, and 27% (est.), respectively, of the total expenditures.

### Net Revenues

The net revenues of the Society have increased over the last three years. The net revenues (losses) of the Society were (\$7,719) for 1992, \$20,685 for 1993, and \$36,531 for 1994. The net revenues for 1994 are significantly above those estimated in the 1994 budget (\$14,800). The variation in the net revenues of the Society is largely due to changes in the net revenues for the annual meeting. This occurs because of the stable nature of the other sources of income and because membership numbers have shown only a slight increase over the past three years.

The net revenues for the annual meeting were \$16,116 in 1992, \$42,682 in 1993, and \$62,375 in 1994. The low overall net revenues in 1992 were due to the existence of prior con-

### Net Revenues



tractual commitments for annual meeting proceedings and the Society's involvement in international travel programs. Those programs were completed in 1992, and no plans exist to reintroduce similar expenditures. The increase in the net revenues in 1994 was due to the larger than expected attendance at the meeting. In particular, the on-site registrations were much larger than anticipated. The estimated net revenues for the 1995 Annual Meeting are \$41,000.

Since 1993, the journal expenses have been stable with net operating losses of \$26,548 in 1992, \$14,581 in 1993, and \$18,311 in 1994. These expenses are significantly lower than earlier years due to the contract negotiated with Plenum Publishing Corporation in 1992 and to greater management control over expenses.

The newsletter expenses have been offset by advertisement revenue to a modest degree. For instance, for the subject years, the advertising revenues have averaged approximately \$4,000 yearly, leading to net operating losses of \$37,500, \$40,900, and \$40,100 respectively. In 1995, the Society entered into a new two-year contract with Tec-Com to produce the newsletter. Because of a clearer definition of relationships and responsibilities for the newsletter, we anticipate that the net cost of the newsletter will be reduced to \$36,000 in 1995.

### Reserves

Cash reserves are those funds (in savings and investments) that remain at the end of the fiscal year after all revenues have been obtained and all bills paid. These funds are important not only to avoid difficulties with cash flow but also to provide insurance against unforeseen reversals in the financial projections of subsequent years. Most societies of our size and maturity are recommended to have cash reserves equivalent to one year's operating budget. If SRA were to meet this criterion, it should have had \$353,200 (the 1995 budget of \$368,000 minus the hoped-for contribution to cash reserves of \$14,800) at the end of 1994. As of the close of 1994, the Society's cash reserves were approximately \$125,000. This is an improvement over prior years but is still considerably less than what is needed to responsibly manage the Society in the future. Based on the budget for fiscal year 1995, we hope to add an additional \$32,000 to that sum. With a successful annual meeting in Hawaii, we will meet our objective. However, that still leaves an uncomfortable distance from our general target of \$312,000 in cash reserves.

For fiscal year 1996, the Society plans to raise net revenues in several ways. First, SRA will raise the annual dues to \$85. This will result in an increase of approximately \$17,000 in additional income. Second, we will again be holding a midyear workshop on risk assessment (an activity that is also consistent with the Society's educational mission). Third, the Society is seeking to actively control its expenses. The officers have taken steps to assure that workshops at this year's annual meeting will be on a sound financial basis. The Secretariat has also continued to control postage, printing, and other direct costs. Finally, the new contract with Tec-Com is also an important step in this process.

With these objectives in mind, the 1996 budget is presently being prepared for review, revisions, and approval at the annual meeting in December.

# Harmonization of Approaches to the Assessment Of Risk from Exposure to Chemicals

*(The following invited article by Cynthia Sonich-Mullin describes a coordinated project of the International Programme on Chemical Safety\* in collaboration with other international partners.)*

In 1993, the International Programme on Chemical Safety (IPCS) embarked on a project to harmonize approaches to the assessment of risk from exposure to chemicals. The overall goal of this project is to globally harmonize approaches to risk assessment through increased understanding, focusing on specific issues and striving for agreement on basic principles. Such harmonization should not be perceived as standardization, but is defined as an understanding of the methods and practices used by various countries and organizations so as to develop confidence in and acceptance of assessments that use different approaches. It further involves a willingness to work toward convergence of these approaches or methods as a long-term goal. Progress through all stages of this project will result in efficient use of resources and consistency among assessments.

Achieving harmonization of approaches will afford several opportunities, including a framework for comparing information on risk assessment, an understanding of the basis for exposure standards for specific chemicals in different countries, progress toward common classification and labeling schemes for hazardous chemicals, savings of time and expense by sharing information leading to a potential non-requirement to repeat assessments, and credible science.

**Background.** The assessment of risk from exposure to chemicals in the environment is of global importance. Risk assessment activities are conducted on national, regional, and international levels. However, historically, minimal attempts have been made to systematically coordinate these assessments. Current regulatory requirements and research agendas coupled with limited resources indicate the importance and necessity of such coordination.

Several international meetings and agreements have underscored the importance of harmonization of assessment methods, in particular, the United Nations Conference on Environment and Development (UNCED) and the establishment of the World Trade Organization (WTO). The UNCED, held in 1992, recognized that the use of chemicals is essential to meet social and economic goals, while also acknowledging that much remains to be done to ensure the sound management of chemicals. The establishment of WTO places particular emphasis on the assessment of risks from a trade perspective and further displays the importance of a coordinated effort in this area.

The harmonization of chemical risk assessment has been actively discussed and pursued within the IPCS, a joint activity of the World Health Organization, International Labor Organization, and United Nations Environment Programme. IPCS is in a unique position to coordinate this international effort through its collaboration with other international part-

ners. Coordination has expanded to the Organization for Economic Cooperation and Development (OECD), Food and Agriculture Organization (FAD), and United Nations Industrial Development Organization (UNIDO), within the framework of the Inter-Organization Programme for the Sound Management of Chemicals (IOMC), as well as with regional/intergovernmental (e.g., European Commission) and national (e.g., U.S. Environmental Protection Agency) organizations. By convening an initial planning meeting, the willingness and commitment of the various organizations, agencies, and countries to move forward in this area were obtained.

**Scope.** The project is being pursued on two levels. The first focuses on sound scientific principles. The second bridges the gap, often wide, between policy/decision making and scientific considerations. While sound science should govern our decisions, policy issues that will affect the implementation of the scientific recommendations made must also be addressed. Standardization of management issues is not implied; rather inherent to any discussion of scientific principles used for risk assessment is the need to facilitate the application of science in the policy arena. This goal can be accomplished only with a clear understanding of the context of management issues. To this end, a Steering Committee, comprised of individual scientists who are knowledgeable of the approaches used in their organizations and who can affect necessary and agreed-upon changes in such approaches, has been established.

The initial focus of this endeavor will be on approaches to the assessment of risk to human health. Following an evaluation of ongoing efforts on ecological issues, this additional focus may be pursued as a secondary priority. This project considers qualitative and quantitative risk assessment methods as well as methods used to determine endpoint-specific effects.

**Accomplishments.** Two scientific workshops have been convened: one on reproductive and developmental toxicity, and another on issues related to carcinogenicity and mutagenicity (germ cells). The specific recommendations emanating from these workshops were presented before the Steering Committee. Guidance on further action with regard to these recommendations and on the process employed was solicited.

**Planned Efforts.** As a result, specific follow-up activities will concentrate in the following areas:

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\*World Health Organization, 20 Av. Appia, 1211 Geneva 27, Switzerland. For more information on this project, please contact Cynthia Sonich-Mullin at telephone (41) 22 791 4335, fax (41) 22 791 4848, e-mail sonich@who.ch.

- reproductive and developmental toxicity, focusing on the definition and standardization of nomenclature and the elucidation of general principles to define adversity;

- carcinogenicity by comparing and contrasting risk assessment practices for a number of chemicals using current guidelines;

- mutagenicity by developing international guidelines for quantitative mutagenicity risk assessment using the qualitative scheme identified by the workshop (to be published in *Current Issues in Mutation Research*);

- neurotoxicity as an additional endpoint, followed by immunotoxicity and specific issues in systemic toxicity;

- review of methodologies for exposure assessment and the use of this information in risk assessment;

- a consensus approach to highlight the important aspects of reporting risk estimates (initial focus on reproductive and developmental toxicity);

- compilation and review of ongoing work on harmonization of approaches used in ecological risk assessment;

- consistent, harmonized use of terminology.

Other cross-cutting issues (e.g., the use of epidemiological data in risk assessment and associated activities to promote the collection of such data, training and awareness building) were recognized and will be pursued as resources allow. In addition, the need to focus on an integrated approach to risk assessment was also recognized.

An issue impacting all aspects of this project is the consistent, harmonized use of terminology. An IPCS/OECD Joint Project on the Harmonization of Chemical Hazard/Risk Assessment Terminology is being initiated under the auspices of the Inter-Organization Programme for the Sound Management of Chemicals. The project will focus on both generic and technical terms used in chemical hazard/risk assessment.

The cooperation between organizations is necessary to avoid duplication of effort, optimize use of limited resources, and allow the harmonization of risk assessment approaches to become a reality in the long term. Harmonization of risk assessment approaches cannot be dictated; it will be the result of a process that promotes interaction and communication. It is this process that is being fostered by the IPCS.

## Journal Search Committee to Report

The Society for Risk Analysis has taken another step toward expanding the editorial leadership of its journal, *Risk Analysis*. Within the context of expanding the editorial function from a single individual to a management group composed of an editor-in-chief and three associate editors (representing diverse disciplinary perspectives), the committee charged with recommending candidates for the senior editorial role has been diligently searching for candidates in three disciplinary areas that are often at the core of risk analysis: life sciences, social sciences, and engineering. The committee envisions a broadened outreach by the journal and a process that provides a natural succession by an associate editor to editor-in-chief. Under the new arrangement, the editor-in-chief will be able to devote more time to major policy developments and special projects that will enable the journal to meet ever-changing and expanding demands from the Society's membership and the scientific community at large.

The committee will make its recommendations to the SRA Council in December at the SRA Annual Meeting. Those wishing to make recommendations for associate editors should forward their proposals directly to the Secretariat (see masthead).—*R. G. Tardiff, Committee Chair*

## Membership Meeting December 4

For the third straight year, an all-membership meeting will be held at SRA's annual meeting to provide a forum for members to voice their ideas to officers and councilors on improving the operation of the Society. Sponsored by the Membership Committee, the meeting will be held on Monday, December 4, at 5:30 p.m. in the hotel's Koko Crater room. The committee members are Caron Chess (chair), Srinivas Emani, Catherine St. Hilaire, Ronald Joiner, Randy Morly, Suellen Pirages, Ruth Thompson, Vern Walker, and Michaela Zint. Persons wishing to make suggestions in advance of the

## Advertisements

### Two Summer Institute Courses Offered

**May 13-17, 1996:** *Summer Institute in Risk Management in Environmental Health and Protection (including Quantitative Risk Assessment)*. **May 20-24, 1996:** *Summer Institute in Environmental Law*. For more information, contact: Prof. R. Zimmerman, Wagner Graduate School of Public Service, New York University, 4 Washington Square North, New York, NY 10003, telephone (212) 998-7432 or (212) 998-7450, fax (212) 995-3890. For graduate credit or non-credit certificate.

### PATHWAY ANALYSIS AND RISK ASSESSMENT FOR EXPOSURE TO CHEMICALS IN THE ENVIRONMENT

A Five-Day Course

March 4-8, 1996 • Kiawah Island, SC

This course is designed for those wishing to learn about risk assessment for exposure to chemicals in the environment; persons who must make decisions about cleanup of chemically contaminated sites; or those who are responsible for compliance related to chemical contamination and remediation. Registration Fee is \$1,495 or \$1,395 for government employees.

TO REGISTER, CALL 312-988-7667

annual meeting should contact Zint at fax (517) 353-6496, or e-mail [zintmich@pilot.msu.edu](mailto:zintmich@pilot.msu.edu).

The 1994 membership meeting included discussions on the role of the Society in public policy issues; the use of new communication technologies; greater commitment to diversity within the Society; the dues structure, meeting expenses, and student financial awards; multidisciplinary reviewers for the SRA journal; and improving SRA procedures.

## Member News

**Milton Russell**, head of the Joint Institute for Energy and Environment, a research consortium of Oak Ridge National Laboratory, Tennessee Valley Authority, and the University of Tennessee, will direct the new National Center for Environmental Decision-Making Research (NCEDR), which the institute will create with funding of \$1 million per year for five years from the National Science Foundation and with matching funds. The center intends to improve the environmental decision-making process in both the public and private sectors. Russell will lead interdisciplinary research teams representing economics, urban planning, policy analysis, sociology, geography, mathematics, ecology, psychology, political

science, and computer science, which will synthesize existing research, perform case studies, assemble a "toolkit" of processes and techniques, and design a national information infrastructure. A search for a deputy director of the center is under way (see page 11).

**Vincent Ho**, treasurer of SRA's Southern California Chapter, has joined Booz-Allen & Hamilton Inc., where he will specialize in transportation and fire risk analysis, decision-making analysis, and risk-based business process reengineering. His new address is: Booz-Allen & Hamilton Inc., 523 W. 6th Street, Suite 650, Los Angeles, CA 90014, telephone (213) 620-1900, fax (213) 622-2464, e-mail ho\_vincent@bah.com.

## SRA-Japan News

The Japan Section of the Society for Risk Analysis recently accepted a research contract with the Division of Environmental Health and Safety of the Environmental Agency, Japan, to produce a report on the measures and approaches of risk management concerned with reducing environmental and health risks in terms of risk assessment, risk management, and risk communication. The contract period of one year will have a budget of 3 million yen (around \$30,000 US).

In 1994, the Environmental Agency, Japan, established the Basic Plan of Environmental Preservation, following the enactment of the Basic Environmental Law of 1993, which resulted from concerns of global and intergenerational issues. These concerns, which originally focused primarily on pollution-based health damages, now include health risks due to carcinogens and to hazardous chemicals and heavy metals. In addition, the preservation of biological diversity has been

included as a principal concern. With all of these issues to be considered, the agency is focusing on risk-based decision making.

The contract marks the second request that the Japan Section of SRA has received from an outside organization to conduct research. The Central Research Institute of Power Generation, a private organization, provided the first contract. However, the second contract is from a government organization, which means Japan's government has officially acknowledged the Japan Section of SRA as a research body in Japan's environmental policy arena.

The section is publishing the proceedings of its spring symposium on product liability and risk communication in the *Japanese Journal of Risk Analysis*, Volume 7, Number 1. The volume, written in Japanese, will also include the table of contents and the abstracts in English.

## U.S. Chapter News

**East Tennessee Chapter** meets monthly for brown-bag luncheons and, generally, two short presentations. In July, J. Randall Kirchner of H&R Technical Associates Inc. discussed the risks of handling vs. transporting dangerous goods, and Steven V. Kaye of Popoo Technical Services Inc. presented the risks to biota from radioactivity released to the environment. In August, William R. Rhyme of H&R Technical Associates Inc. spoke on writing and publishing a book on transportation risk, and David C. Kocher of Oak Ridge National Laboratory compared the regulatory approaches employed by the radiation protection and environmental protection communities. In September, Alvin M. Weinberg, former director of Oak Ridge

National Laboratory, spoke on strengthening the tradition of non-use of nuclear weapons.

**Metropolitan Chapter (Connecticut-New Jersey-New York)** organized and co-sponsored a seminar on "Electromagnetic Fields: An Update" with the Association of the Bar of the City of New York. The chapter is currently planning other seminars on risk benefit/cost analysis and treatment-resistant infectious diseases. A recent amendment to the chapter bylaws extends the terms of the chapter's officers to two years, including the president, Wayne Tusa of Environmental Risk and Loss Control Inc., and the president-elect, Rao V. Kolluru of CH2M Hill.

**Michigan Chapter** met October 26 at the Ford Motor Company World Headquarters for a program titled "Risk and Regulations," which included discussions on recent changes to Michigan's groundwater and soil remediation criteria (Act 307) and the Federal Air Toxic Rules 112(g) and 112(r).

**National Capital Area Chapter** hosted a networking reception on October 5 at the American Industrial Health Council, where the chapter's new president Cindy A. Jengeleski is the manager of scientific programs. The chapter's bi-monthly meetings offer a forum for regulators, the regulated community, and other interested parties to



meet one-on-one and debate the future of health, safety, and environmental decision making.

**New England Chapter** is now transmitting its monthly communications via electronic mail to those on its e-mail mailing list. The chapter's joint seminar series with the Boston Risk Assessment Group will run monthly through June 1996. The 1995-96 series, which the new chapter president Michael J. Hutcheson has planned, began in September with James K. Hammitt of the Harvard Center for Risk Analysis speaking on cost-benefit analyses in risk assessment and Tsedash Qewdie and Michael J. Hutcheson of the Massachusetts Department of Environmental Protection presenting an update on health risk evaluation methodology. The October seminar included Penelope Schafer and Michael Fisher of Abt Associates Inc., who presented examples of cost-benefit analyses in support of U.S. Environmental Protection Agency regulations, and Douglas Smith of ENSR Consulting & Engineering, who spoke on dioxin movement in the environment. The next seminar will be November 15.

**Northern California Chapter** will hold a joint meeting with the Society of Toxicology's Northern California Chapter on November 1. Dr. Lynn R. Goldman, assistant administrator for the U.S. Environmental Protection Agency Office of Prevention, Pesticides and Toxic Substances, will speak on "New Directions and Controversies in Risk Assessment." The chapter will hold elections in December. The chapter's Pro Bono Committee, chaired by Bruce Siegel, is surveying the membership for individuals interested in providing pro bono services. To learn about this program, contact Siegel at APTECH Engineering Services, telephone (408) 745-7000, fax (408) 734-0445, e-mail aptechjh@ix.netcom.com.

**Philadelphia Chapter** will hold the first meeting of its 1995-96 program year on November 9 at the University of Pennsylvania Faculty Club. Hugh L. Spitzer of Environmental Network, who is the science advisor to U.S. Representative Dick Zimmer (R-NJ), will present an overview, from the Republican point of view, of the ongoing environmental

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**Rocky Mountain:** Yvette Lowney, president, (303) 444-7270

**Southern California:** Larry Froebe, president, (714) 660-5464, itirvine@earthlink.net

debate and a discussion on how regulatory reform could change current risk assessment practices. The chapter's meeting in January will feature the Democratic point of view. Chapter officers who began new terms in September include the president, Clay B. Frederick of Rohm and Haas Company, and the president-elect, Kenneth R. Foster of the University of Pennsylvania.

**Research Triangle Chapter** met in September at the Chemical Industry Institute of Toxicology (CIIT), with Douglas J. Crawford-Brown of the University of North Carolina Institute for Environmental Studies speaking on "Assessing Risks from Several Pollutants Simultaneously: The Case of Risk Analysis for Environmental Tobacco Smoke and Radon in Indoor Air." In October, the chapter and the institute co-sponsored a panel discussion on "EPA Risk Assessment Guidelines: Where to from Here?" The speakers included SRA members William H. Farland of the U.S. Environmental Protection Agency, Adam M. Finkel of the U.S. Occupational Safety and Health Administration, Rory B. Conolly of

CIIT, and Clay B. Frederick of Rohm and Haas Company.

**Southern California Chapter** has been searching for a way to serve its members and other interested professionals who are too dispersed geographically to regularly attend chapter events but are willing to attend professional meetings nearby. To address the situation, the chapter began to focus last year on a theme of "building bridges" with other professional organizations interested in applications of risk analysis and to establish itself as their resource for risk analysis topics. Currently the chapter is publishing information about the other organizations and their risk-related programs in "Risk Forum," a new column of the chapter's newsletter *Risk Resources* that informs readers about risk-related events in their localities. By establishing the best source of information about risk activities in Southern California and becoming known to more risk professionals, the chapter hopes to benefit by increased attendance and support of its functions. For more information on this initiative, contact Larry R. Froebe of IT Corporation (see box).

**SRA Sections and Chapters Committee Chair Rae Zimmerman invites a representative from each SRA section and chapter to attend a breakfast meeting on Tuesday, December 5, from 7:00 to 8:30 a.m., at the 1995 SRA Annual Meeting. Each attendee should plan to give a brief chapter or section report at the meeting.**

## SRA Specialty Groups

The five Society for Risk Analysis specialty groups will hold their individual meetings on either Sunday evening or Monday morning of the 1995 SRA Annual Meeting in Hawaii. The meeting organizers staggered the schedule of specialty group meetings this year to accommodate anyone wanting to attend more than one meeting. The following reports include the time for each meeting:

**Dose-Response Specialty Group.** Five theoretical sessions at the annual meeting will cover the biological basis for dose-response mechanisms and mode of action, and quantitative dose-response modeling for cancer and noncancer endpoints. The sessions will include novel approaches applied to old problems and standard approaches used in new areas.

Four applied sessions will investigate established approaches to dose response for high-interest chemicals, Monte Carlo analysis and physiologically based pharmacokinetic models, and the international harmonization of risk assessment methods. The sessions will have a more limited range of topics than the theoretical sessions but will provide greater depth for such high-impact chemicals as chloroform, chromium, dioxin, methyl tertiary butyl ether, and trichloroethylene.

*The Dose-Response Specialty Group will meet on Sunday evening, December 3, from 6:00 to 7:30.* For more information, contact Scott Baker of EA Engineering, Science, and Technology Inc., Silver Spring, Maryland, telephone (301) 565-4216, e-mail sb@eaeng.mhs.compuserve.com, fax (301) 587-4752.

**Ecological Risk Assessment Specialty Group.** Three annual meeting sessions will focus specifically on ecological risk assessment, and several will deal with related issues, such as global climate change. Other papers scheduled throughout the conference will cover a range of topics from ecological risks in the military base closure process and the use of Monte Carlo analysis in evaluating ecological risks and impacts to the challenges of communicating ecological risks.

Risk assessors and managers currently face a variety of issues associated with the process of evaluating potential ecological risks from both chemical and non-chemical stressors, as well as with the interpretation and communication of ecological risk assessment results. *The Ecological Risk Assessment Specialty Group invites interested conference participants to join them in discussing these and other topics at its meeting on Monday morning, December 4, from 7:00 to 8:30.* For more information, contact William Alsop of Harding Lawson Associates, Novato, California, telephone (415) 884-3136, fax (415) 883-3300.

**Engineering Specialty Group.** Annual meeting sessions on engineering will include a two-part symposium on the impact of potential climate change on engineered systems and a symposium on maintenance and rehabilitation in engineered water systems. Other sessions will focus on risk management of engineered systems, including nuclear plants.

*The Engineering Specialty Group will meet on Sunday evening, December 4, from 6:00 to 7:30.* For more information, contact Robert J. Mulvihill of PRC Inc., El Segundo, California, telephone (310) 640-1050 or (619) 721-2540, fax (310) 640-2207, e-mail mulvihill@aol.com.

**Exposure Assessment Specialty Group.** The annual meeting will include eight platform sessions and two poster sessions specifically oriented toward exposure assessment. The topics include multi-media/pathway exposures, dietary and dermal exposures, special characteristics of Native American populations, and exposures to volatile organic chemicals (VOCs). Additional sessions on risk and Monte Carlo methods will also include treatment of exposure assessment.

*The Exposure Assessment Specialty Group will meet on Monday morning, December 4, from 7:00 to 8:30* to choose a new chair-elect and discuss other business. Topics to be discussed will include the 1996 joint meeting of SRA and the International Society of Exposure Analysis (ISEA) in New Orleans. The ISEA technical program committee, which includes SRA Exposure Assessment Specialty Group representatives, has already begun planning the joint meeting.

For more information, contact Thomas E. McKone of the University of California, Davis, telephone (916) 754-8757, fax (916) 752-3394, e-mail tmck@llnl.gov; or its secretary/chair-elect, John C. Kissel of the University of Washington, telephone (206) 543-5111, fax (206) 543-8123, e-mail jkissel@u.washington.edu.

**Risk Communication Specialty Group.** Risk communication sessions at the annual meeting will include three symposia on public views of nuclear power risks and other hazards, risks in developing countries, and conceptualizations of risk. Three sessions will focus on cross-cultural risk perceptions, communication, and management; and two will deal with stakeholder input into the U.S. Department of Energy risk management. Other topics include communicating about uncertainty, communicating epidemiological and other scientific results, comparative risk and priority-setting, evaluating U.S. Environmental Protection Agency dioxin communication and the results of EPA regulations mandating education on lead in drinking water, designing effective texts, formats and programs for risk communication, and innovative uses of focus groups. Other topics of interest include cross-cultural sessions organized by the Japan Section of SRA and the role of scientists and the public in risk assessment and management.

*The Risk Communication Specialty Group will hold its business meeting on Sunday evening, December 3, from 6:00 to 7:30* to inaugurate new officers and discuss a proposed bylaws change regarding officers, a specialty group newsletter, and a report on the annotated bibliography for industry risk communication. For additional information, contact Branden B. Johnson of the New Jersey Department of Environmental Protection in Trenton, telephone (609) 633-2324, fax (609) 292-7340, e-mail brandenj@eohsi.rutgers.edu.

## Advertisements

### Human Health/Ecological Risk Assessor

The Alameda Office of Parsons Engineering Science seeks experienced Human Health/Ecological Risk Assessor with BS and MS in toxicology and/or related environmental science or engineering. Minimum 8 years experience in performing human health and ecological risk assessments for air, water and land pollution type projects (e.g., CEQA, RCRA and CERCLA, AB-2588 and recycling.) Experience in representing clients before regulatory agencies and excellent communication skills also required. Marketing and client maintenance a plus. In addition to enjoying a competitive benefits package, professional challenge is a reality at Parsons ES, where employees profit by working for a 100% employee-owned company. Send letter of interest and resume to Ms. Cherrie DeBenedetti, Parsons Engineering Science, 1301 Marina Village Parkway, Alameda, CA 94501.

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### NSF Center Deputy Director

Applications are solicited for the position of Deputy Director of the newly established National Center for Environmental Decision Making Research, funded by the National Science Foundation. The Center is a component of the Joint Institute for Energy and Environment, a research collaboration of Oak Ridge National Laboratory, the Tennessee Valley Authority, and the University of Tennessee. It is administered and housed at UT in Knoxville, Tennessee.

The Deputy Director will participate in research and research management, and will direct an extensive outreach program. Administrative experience is highly desirable. The field of expertise of the successful candidate is open; a substantial research record, preferably directly related to research on how environmental decision processes can be improved, is required. The salary is open; benefits are excellent.

Applications are requested before November 30 but will be accepted until the position is filled. Please send resumes and other information to Dr. Milton Russell, Director, Joint Institute for Energy and Environment, 600 Henley Street, Suite 314, Knoxville, TN 37996-4138. UTK is an EEO/AA/Title IX/Section 504/ADA Employer.

### Senior Risk Assessor

Atlantic Environmental Services Inc. of Colchester, Connecticut, is currently seeking a mid to senior level Risk Assessor.

5+ years of consulting experience including background in PAH contamination and human health risk assessment. Excellent writing skills. Travel is required.

We specialize in providing environmental investigative and engineering services, primarily with respect to waste disposal and contaminated lands management for gas and electric utilities and have earned national and international recognition in resolving environmental issues associated with former manufactured gas plant (MGP) sites.

Atlantic offers a comprehensive benefits package. Please forward resume to Director of Human Resources, Atlantic Environmental Services Inc., P.O. Box 297, Colchester, CT 06415 or fax to (860) 537-6347.

### Assistant/Associate Professor Cost-Benefit/Risk Analysis

Indiana University, School of Public and Environmental Affairs, Bloomington Campus, is seeking an assistant/associate professor in cost-benefit/risk analysis (**10-month tenure-track appointment**). A Ph.D. in public policy, economics, or allied field is required. Experience in the cost-benefit evaluation or policy analysis is desired, along with substantive interests in some other field of public/environmental policy. Applicants must be committed to developing a strong program of research, public service, and teaching within a competitive university setting. For more information see web site: <http://www.indiana.edu/~speaweb/index.html> and click on "SPEA News."

Review begins on November 15, 1995, and continues until suitable candidates have been identified. Send letter of interest, curriculum vitae, and names, addresses and telephone numbers of four references to: Stephen D. Gottfredson, Associate Dean for Academic Affairs, School of Public and Environmental Affairs, Room 300, Job Code: CB-26, Indiana University, Bloomington, IN 47405.

Indiana University is an *Affirmative Action/Equal Opportunity employer*, and strongly encourages applications from members of historically underrepresented groups.

### Tec-Com Inc. Announces New World Wide Web Publication—*Riskwatch*

Tec-Com Inc. has begun a new World Wide Web publication called *Riskwatch* which will cover risk-related news and events. Departments included (or to be included) are News, Calendar of Events, Courses & Workshops, Abstracts Library, Web Sites, News Groups, Professional Organizations (with risk activities), Government Programs (focusing on risk), New Books, New Software, University Programs (related to risk), Fellowships and Grants, Risk Centers, Directory of Risk Professionals, Honors and Awards, and others.

Submissions for *Riskwatch* will be considered by the editors.

Fax to (423) 691-0229 or e-mail to [abbott@usit.net](mailto:abbott@usit.net)



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Visit our exhibit at the 1995 SRA Annual Meeting in Honolulu.



RISK newsletter  
is published by  
the Society for  
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### Thank You

The Society for Risk Analysis gratefully acknowledges the support of the following sustaining members for 1995:

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**Center for Risk Management**  
**Rohm and Haas**

## SRA Dues To Increase

At the March SRA Council meeting there was an extensive discussion of the current dues structure and the anticipated financial needs of the Society. At the meeting the following points were established. First, the Society's cash reserves are approximately \$200,000 below the level that is regarded as necessary for a society of our size. Second, the current dues are significantly below those of similar societies. Third, while the Society has aggressively moved to reduce existing expenses (resulting in a 15% decline in total expenses over the last three years) the Society's current and predicted net income will not provide an appropriate cash reserve for more than six years.

An additional budgetary issue is that SRA has embarked on a two-year effort to expand the editorial leadership for its journal. The current editorial arrangement has provided a unique relationship with Oak Ridge National Laboratory which has minimized, for the Society, the actual cost of operating the editorial office. It is anticipated that a new editor would be unlikely to offer such an arrangement to the Society, nor should the search for an editor be restricted to individuals enjoying government or industry support for that activity. Therefore, the society should plan ahead so that it is able to independently support a high quality journal.

Based upon these findings, the Council unanimously voted to increase the SRA dues by \$10 per year over the next three years, starting January 1996. In an effort to maintain the availability of memberships in the Society for students, the Council also decided unanimously to maintain student dues at their current levels. Finally, the Council agreed to examine further whether or not individuals with annual incomes of less than \$30,000 should be provided a reduced dues rate.

As a result of these actions, the SRA dues for the next three years will be as follows:

	<b>Regular Dues</b>	<b>Student Dues (Without Journal)</b>
1996	\$85	\$10
1997	\$95	\$10
1998	\$105	\$10

This increase of the dues will ensure a better financial health for the SRA, and the independence that the journal needs to retain its exceptional quality in the long run. Yet, the 1999 level of the dues will still make SRA one of the least expensive professional and scientific societies, even by 1995 standards.

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