

RISK *newsletter*

Published by the SOCIETY for RISK ANALYSIS

Volume 14, Number 3

Third Quarter 1994

Congress Focusing on Risk Analysis

One of the hottest buzz words on Capitol Hill these days—risk—was rarely even mentioned just three years ago.

“There is a tremendous hullabaloo on the Hill about risk assessment,” says Jonathan Bender of the Carnegie Commission on Science, Technology, and Government in Washington, D.C. “It seems that everyone has a risk bill or is working on one. The term ‘risk’ itself seems to have almost become a mantra.”

Interest among members of Congress began snowballing in 1993. “Last year was the big bang,” says SRA member March Sadowitz, who is a research specialist for legislative affairs with the Harvard Center for Risk Analysis in Boston, Massachusetts. “Two years ago there was only one bill in Congress on risk analysis. Now there are four or five directly relating to changing the way we do risk analysis, not to mention all the environmental bills that have a discussion of risk analysis.”

Several forces have propelled risk analysis to the legislative forefront. “The nation has realized how difficult it is to prioritize risks in the face of limited resources,” Sadowitz says. “Lawmakers are taking an interest in risk as a way to help decide what we should spend the money on.”

Priorities are needed to help the U.S. Environmental Protection Agency carry out laws and regulations, says Mark Schaefer, the assistant director for environment in the White House Office of Science and Technology Policy. “EPA is responsible for implementing more than a dozen statutes. They are so overloaded with work that they do need some mechanism to step back and ask themselves if priorities are set properly

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Risk Legislation Roundup

Following is a list of major legislation under consideration in the U.S. Senate and House of Representatives.

Risk Assessment Improvement Act of 1994, H.R. 4306. Introduced by Rep. Herb Klein, D-NJ, and Rep. Dick Zimmer, R-NJ, this bill would establish a risk assessment program headed by a director under the EPA Administrator’s office. The director would be responsible for developing guidelines that EPA would have to follow when doing risk assessments. The guidelines would specify what is to be included in risk characterization. The director would also advise the EPA Administrator on the effectiveness of the EPA’s risk assessment efforts, coordinate risk analysis across programs, assess training and recruitment needs, and make recommendations for consistency in the use of risk assessment across the agency.

Risk Reduction Act, S. 110. Introduced by Sen. Daniel Moynihan, D-NY, this bill would establish two committees within the U.S. Environmental Protection Agency, one to rank risks to human health and the environment and another to determine the benefits of eliminating such risks. Supporters say the intent of the bill is to make scientific research, rather than political forces, the basis for selecting health and environmental priorities. The bill also would require the EPA to create risk assessment guidelines by setting minimum standards for different risk assessment approaches.

The Johnston-Mica-Thurman Amendment to the EPA Cabinet bills, S. 171 and H.R. 3425. Introduced by Sen. J. Bennett Johnston, D-LA, Rep. John Mica, R-FL, and Rep. Karen Thurman, D-FL, this amendment would require the EPA to perform a three-part risk analysis when proposing new regulations. Requirements would include assessing the human health or environmental risk addressed, conducting a comparative risk analysis of the addressed risk relative to other risks the public faces, and estimating the cost of implementing and complying with the new regulation.

Risk Communication Act, H.R. 2910. Introduced by Rep. Carlos Moorhead, R-CA, and Rep. George Brown, D-CA, this bill would require changes in the way that the EPA communicates risk assessments. Major requirements would include presenting a best estimate any time an upper bound is reported, distinguishing scientific findings from policy decisions, listing the range of options for assumptions used and justifying the choice of assumptions, presenting exposure assumptions and their likelihood, and comparing the risk in question with other risks familiar to the public.

Zimmer Amendment to the EPA Cabinet bill, H.R. 3425. Introduced by Rep. Dick Zimmer, R-NJ, this amendment would create a new Office of Environmental Risk headed by a director appointed by the President and confirmed by the Senate. The director would develop and implement a strategy to attain risk reduction. The amendment would also create an Advisory Committee on Relative Risks to advise the director.

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SRA Plans Membership Initiatives

Welcoming new members and encouraging membership involvement are two efforts planned for the Society for Risk Analysis 1994 Annual Meeting in Baltimore, Maryland, on December 4-7.

"One of our goals this year is to improve communication between old and new members," said SRA Councilor Caron Chess, who is the chair of the Annual Meeting Committee's subcommittee on membership involvement.

Projects for the meeting include the following:

Issuing special badges for new members. Newcomers to the Society will receive name tags with attached ribbons that read "new member."

Welcoming newcomers. SRA Councilors will be on hand at the opening reception at 5 p.m. Sunday, December 4, to talk with new members about the Society and its projects. Upon request, the Society will also pair new members with longtime members who can introduce them to professionals in their fields of study.

Scheduling new member breakfast earlier. The traditional new member breakfast will be held at 7:30 a.m. Monday, December 5.

Pre-town and town meetings. A town meeting at which all members will have a chance to ask questions about the organization and operation of the Society will be held immediately following the business meeting luncheon on Tuesday, December 6. A pre-town meeting to gather ideas and set an agenda for the town meeting will be held at 5 p.m. Monday, December 5, with refreshments served.

Chapters and sections breakfast. This traditional breakfast will be held at 7 a.m. Tuesday, December 6.

Posting activity sign-up sheets. At the SRA desk at the annual meeting, the Secretariat's office will post sign-up sheets for SRA committees and special tasks.

"We have other goals that may not be implemented by this year's annual meeting, but we're still considering them for

Society to Hold Elections

The Society for Risk Analysis Nominating Committee is in the process of selecting the slate of candidates for the 1994 elections of president-elect, treasurer, and three councilors. The Society will mail ballots to members later this summer and will announce the election results at the 1994 Annual Meeting in December.

"The committee greatly appreciates the contributions of SRA members who responded to the call for nominations in the first quarter issue of the RISK newsletter," said committee Chair D. Warner North of Decision Focus Inc. in Mountain View, California.

Other committee members are Alison Cullen of the Harvard School of Public Health in Boston, Massachusetts; Clifford Duke of Common Sense Environmental in Cincinnati, Ohio; Robert Hetes of Research Triangle Institute in Research Triangle Park, North Carolina; John Kissel of the University of Washington in Seattle; Stanley Levinson of B & W Nuclear Technologies in Lynchburg, Virginia; Catherine St. Hilaire of Hershey Corporation in Hershey, Pennsylvania; and SRA Councilor Rae Zimmerman of New York University in New York City.

the future," Chess said. One such project is surveying the membership to find out which services members value and what improvements are needed. She invites members who have additional ideas on how to improve membership involvement to contact her by e-mail chess_c@aesop.rutgers.edu, telephone (908) 932-8795, or fax (908) 932-7815.

In keeping with its theme, "Risk Analysis: Learning Across Fields of Application," the 1994 Annual Meeting will feature several interdisciplinary sessions.

Editor's note: For more information on the annual meeting, see page 2 of the second quarter 1994 issue of RISK newsletter.

Congress Focusing

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and if we are getting the most from our money for environmental issues."

Among the bills under consideration, the one most likely to pass is the Risk Assessment Improvement Act of 1994, H.R. 4306 (see sidebar on page 1), says Sadowitz. "But even if none of these bills pass, it is a promising sign that members of Congress are talking about using an analytical tool—risk analysis—instead of politics to make decisions."

Some caution that the motives behind proposed legislation aren't based

on scientific advancement in every case. "Some bills seem to be a backlash against regulation. A bill could be a straight jacket if it forced EPA to do full-scale risk assessments where they aren't needed to make good decisions. It could lead to paralysis by analysis," Bender says.

Schaefer voiced the same concern. "Some believe that both a risk assessment and a cost-benefit analysis should be done for virtually every regulatory decision that EPA makes. If we were to go to that approach, it would mean that EPA would have to significantly expand the number of people devoted to risk analysis, and we wouldn't neces-

sarily get more useful information as a result."

Members of Congress aren't the only ones focusing on risk analysis. White House staff members also have made it a priority. "President Clinton appears to be interested in regulating smarter while some in recent administrations seemed to me more interested in regulating less," Bender says. "He and the vice president appear willing to remove the screws and deregulate when called for, as well as to regulate stringently when that is called for.

"To balance economic growth and the environment, they've been more proactive about risk analysis."

PSAM Organizers Form Association

A new organization named the International Association for Probabilistic Safety Assessment and Management has applied to the state of California to incorporate as a nonprofit public benefit corporation for the purpose of organizing the PSAM conferences.

"The sole purpose of IA-PSAM is to organize these conferences once every two years around the world," said their founder and Society for Risk Analysis member George Apostolakis of the University of California in Los Angeles. "It is not a society. It does not have members," he emphasized.

The need for a specific institution to handle conference funds and the desire for PSAM to become a truly international meeting were the motivating factors to form a formal organization, said Apostolakis. SRA through its Southern California Chapter had organized the previous conferences but felt that the conference was growing larger than one chapter could sponsor. "We are hoping to maintain our close ties with SRA," Apostolakis stated, "so this is not a move to get away."

The PSAM conferences focus on the engineering aspects of risk and not the areas that SRA annual meetings traditionally cover, such as risk communication. "We are trying to complement rather than compete with the SRA meetings," Apostolakis said. "In fact, (SRA President-Elect) Elisabeth Paté-Cornell had the interesting idea that maybe we should try in the years when we don't have a PSAM meeting to cooperate more closely with SRA."

The association's articles of incorporation will establish a board of 16 directors. SRA member and the 1996 conference's General Chairman Ioannis Papazoglou of the Institute of Nuclear Technology and Radiation Protection in Attiki, Greece, will be the association's first president. Apostolakis will serve as the association's secretary for a six-year term and will set up the its secretariat at his university office.

Other board members will include R.A. Bari of Brookhaven National Labo-

(Continued on page 4.)

Universities Report on Risk Programs

From the East Coast to the West, several universities have strong histories in risk analysis courses and research. Following are details on the graduate-level programs offered at three U.S. universities.

Clark University

Clark University in Worcester, Massachusetts, offers two programs for graduate students in the field of risk analysis.

Within the university's Geography Department, about 12 doctoral students a year study natural and technical hazards or global environmental change. "We have a long history in this area," said Roger Kasperson, who is director of the university's Center for Technology, Environment, and Development. "We've had students specializing in hazards and risk analysis for over 30 years."

The university's second risk-related program is in environment, technology, and society, which was founded in the early 1980s. Students can focus on risk analysis or technology assessment. "We've graduated three or four students a year for more than 10 years through this program," Kasperson said. "These students tend to be more applied professionally—they work for government agencies, consulting firms, and planning agencies."

The university emphasizes student involvement in research projects. "We have 10 to 12 research projects about risk going on at any one time," he said. "We have a large amount of student involvement in each."

University of California

Graduate students interested in risk analysis can specialize in probabilistic safety assessment at the University of California in Los Angeles.

"Our strength is our emphasis on engineering," said Professor George Apostolakis. "We produce engineers who know probabilistic safety methods, which some call probabilistic risk methods."

The university's School of Engineering and Applied Science offers risk-related degrees in nuclear science and engineering and in risk and systems analysis through its Department of Mechanical and Aerospace Engineering.

The university has offered risk-related courses since the early 1970s, said Professor Emeritus David Okrent. Approximately 25 students major in risk-related areas each year. "Our roots are deep," Okrent said. "We do a lot of work on environmental risks and societal risks in addition to technical systems."

Harvard University

Harvard University's Center for Risk Analysis in Boston, Massachusetts, offers two degrees that have a strong emphasis on risk analysis. The center's director is SRA Councilor John Graham.

Doctoral students can receive a Sc.D. in environmental health or a Ph.D. in health policy, both of which require core courses such as Fundamentals of Exposures and Risk Assessment, Seminar on Risk Analysis and Public Policy, and Principles of Decision Analysis.

In 1993, the center's eight doctoral candidates researched topics such as strategies to address childhood lead exposure, the impact of economic development upon human and environmental health along Mexico's border with the United States, and cancer risks from exposure to perchloroethylene emissions from dry cleaners.

Editor's Note: This is the second article in the newsletter's current series on graduate-level risk courses at universities.

PSAM*(Continued from page 3.)*

ratory in Upton, New York; Dennis Bley of Buttonwood Consulting Inc. in Fountain Valley, California; Carlo Cacciabue of the European Union's Joint Research Center in Ispra, Italy; Andrew Dykes of PLG Inc. in Newport Beach, California; Sergio Guarro of the Aerospace Corporation in Los Angeles, California; E. I. D. Harvey of WS Atkins Safety & Reliability in Epsom, Surrey, Great Britain; P. Kafka of GRS in Garching, Germany; S. Kondo of the University of Tokyo in Japan; Ali Mosleh of the University of Maryland in College Park; Robert Mulvihill* of PRC Inc. in El Segundo, California; K. Murphy of the U.S. Department of Energy in Washington, D.C.; Douglas Orvis* of Accident Prevention Group in San Diego, California; Nathan Siu* of EG&G Idaho Inc. in Idaho Falls; and Michael Stamatelatos* of Scientech Inc. in San Diego.

Cacciabue will be the technical program chair of the third PSAM conference, which will be held in Crete in June 1996. For conference information, contact him at fax number 39 332 785 813 or General Chairman Papazoglou at fax number 30 1 653 3431.

*SRA members.

Member News

Betty Locey, the Society's Michigan Chapter president, has accepted a new position with Clayton Environmental Services Inc., 22345 Roethel Drive, Novi, MI 48375, telephone (810) 344-2663, fax (810) 344-2655.

William R. Rhyne of H&R Technical Associates Inc. in Oak Ridge, Tennessee, is author of the book *Hazardous Materials Transportation Risk Analysis* published by Van Nostrand Reinhold (ISBN 0-442-01413-9).

SRA President **Robert G. Tardiff** of EA Engineering, Science & Technology Inc. in Silver Spring, Maryland, is a co-editor of the book *Methods to Assess DNA Damage and Repair: Interspecies Comparisons* published by John Wiley & Sons Ltd. (ISBN 0-471-94256-1).

SRA International Reports**Japan Section Has New Officers**

The Society for Risk Analysis' Japanese section introduced new officers President Saburo Ikeda of Tsukuba University in Ibaraki and Vice-president Hirotada Hirose of Tokyo Woman's Christian University at the section's 7th Spring Meeting and Symposium on June 10. Both officers will serve two-year terms.

Over 70 participants attended the symposium, which was titled "Risk Perspectives in Man-Machine Interface Systems" and addressed human factors in engineering accidents or failures. Isao Kuroda of Waseda University in Tokyo gave the keynote speech on the human factors in safety management for labor sciences. Three panelists made presentations: Professor Emeritus Akira Azuma of Tokyo on analysis and safety management for airplane accidents; Toshihisa Ikeda of the East Japan Railway Company Ltd. in Tokyo on human factors in train accidents; and Fumiya Tanabe of the Japan Atomic Energy Research Institute in Ibaraki on human factors in nuclear power plant accidents.

The section has proposed to the Society that SRA-Japan members should lead four sessions of the 1995 Joint SRA/SRA-Japan Annual Meeting in Hawaii. The section is considering the following events: (1) a panel discussion on risk perception and communication in a socio-cultural context—experiences in the United States and Japan; (2) a roundtable discussion on environmental policies in Japan for reducing human risk consequences; (3) sessions on monitoring-based risk analysis versus predictive modelling approach—methodological background; and (4) sessions on life cycle assessment for product safety, environmental load reduction, and global risk mitigation due to product consumption.

SRA-Japan invites SRA members to send comments concerning the proposal and preparations for the 1995 meeting to SRA Councilor Tohru Morioka, Department of Environmental Engineering, Osaka University, fax 81 6 877 8497, or Saburo Ikeda at the SRA-Japan Secretariat (see box below).

SRA International Contacts

Croatia: Branimir Molak, Daniciceva 33/IV, 41000 Zagreb, Croatia, telephone 385 41 329 816, e-mail molak@rujan.srce.hr

Czech Republic: Karel Blaha of the National Institute of Public Health in Prague, Czech Republic, telephone 422 67311 467, fax 422 67311 236, e-mail blaha@earn.cvut.cz*

SRA-Europe: W. Leyens-Wiedau, Society for Risk Analysis-Europe, Procter & Gamble Company, Postfach 2503, Sulzbacher Strasse 40, D-65818 Schwalbach a. T., Germany, telephone 49 6196 89 4398, fax 49 6196 89 4476

SRA-Japan: Saburo Ikeda, Society for Risk Analysis—Japan Section Secretariat, University of Tsukuba, Institute of Socio-Economic Planning, Tsukuba, Ibaraki 305, Japan, telephone 81 2 98 53 5380, fax 81 2 98 55 3849, e-mail ikeda@shako.sk.tsukuba.ac.jp

Philippines: Corazon PB. Claudio of Technology, Environmental Risk and Management Foundation Inc. in Manila, Philippines, telephone 63 2 673 2619, fax 63 2 693 4079

Russia: Vitaly A. Eremenko of the International Centre of Educational Systems in Moscow, Russia, telephone 7 095 275 3489, fax 7 095 924 6852, e-mail vityal@glas.apc.org*

Ukraine: Naum I. Borodianskii of the V. Glushkov Institute of Cybernetics in Kiev, Ukraine, telephone 7 044 266 1558, fax 7 044 266 7418

*New e-mail address.

SRA International Reports

SRA-Europe Pursues Journal Publication

The Society for Risk Analysis' European section has taken a step closer to publishing its own journal by deciding to select a publisher.

SRA-Europe's Executive Committee discussed the journal at its May meeting after hearing a proposal by Committee member Philippe Hubert of the Institute of Protection and Nuclear Safety in France.

The Committee agreed that an SRA-Europe journal would not compete with the Society for Risk Analysis' existing publication titled *Risk Analysis: An International Journal*, but instead it would provide scientific exchange on topics of particular interest in Europe.

To increase the range of accessibility for European readers, the Committee is considering publishing articles in different languages in each issue of the journal.

Tentative plans also include a news department in the journal.

SRA-Europe President Detlef Müller of Procter & Gamble in Germany headed the meeting held May 6 and 7 in Stuttgart, Germany, which will be the site of the section's 1995 conference (see box on this page). Ortwin Renn of the Center for Technology Assessment in Baden-Württemberg, who is the organizer of the section's 1995 conference, hosted the meeting.

SRA-Europe Calls for Papers

The Executive Organizing Committee of the Society for Risk Analysis-Europe Fifth Conference is calling for papers for the conference that will be held May 21-25, 1995, at the Congress Center Stuttgart in Germany. Abstracts are due in October 1994, and authors will receive notification concerning their papers in January 1995. Full papers are due at the time of the conference.

Titled "Risk Analysis and Management in a Global Economy: Repercussions for Industry, Academia, Insurances, Regulators, and the Public," the conference is organized in four parallel tracks: (1) contributions of risk analysis to bridging the gap between western and eastern practice of risk management and policy implementation in Central and Eastern Europe; (2) new challenges for risk prevention and risk management concerning insurance for environmental and industrial risks; (3) diversities and plural values in risk perception, communication, and mediation; and (4) case studies and experiences in risk-related fields involving new developments in risk analysis.

Abstracts should be two to three pages in length and summarize both the structure and the results of the paper. SRA-Europe will distribute the papers to conference registrants, and conference organizers plan to publish proceedings.

For more information, contact Ortwin Renn, Conference Organizer, SRA-Europe Fifth Conference, Center of Technology Assessment in Baden-Württemberg, Nobelstrasse 15, D-70569 Stuttgart, Germany, telephone 49 711 6783 160, fax 49 711 6783 299, e-mail renn@afta-bw.de.

In other business, the Committee plans to hold the 1996 SRA-Europe conference at the United Kingdom's University of Surrey in Guildford and appointed Ragnar Löfstedt of the university's Centre for Environmental Strategy to coordinate the event.

The Committee also addressed drafting an SRA-Europe charter, broad-

ening the section's financial base to support the establishment of a secretariat for the section, building a higher profile for SRA-Europe, contacting risk analysis professionals in Africa, and cooperating with SRA in an exchange program of lectures.

For the upcoming elections, the section will mail ballots in July.

SRA-Russia Reports on Areas of Need

The Russian risk community is interested in receiving recommendations from U.S. and Western European risk experts on how to handle several issues, according to Vitaly Eremenko, chair of the SRA-Russia Organizing Committee. Eremenko, who is also a member of the SRA-Europe Executive Committee, presented his report to the Committee at its May meeting in Germany.

"The most important and contemporary goals of our local chapters are widely disparate from those of SRA members in developing and Western countries," Eremenko said.

He outlined the following major areas of concern to the 10 SRA chapters in Russia:

- Communication between risk analysts and those who

use their studies, such as politicians, business people, government agencies, and the public;

- Tools for estimating integral synergistic radiation and toxic risk for people;

- Methodologies of risk analysis to estimate and minimize the risk to the public from military hazards as the military undergoes changes, particularly with respect to mobile rocket transport systems, the repositories of nuclear and chemical ammunition and wastes, submarine nuclear reactors, and nuclear weapons;

- Methods of calculating the human risk from hazardous industries and ways to combine these results with the results from estimates of ecological risks.

U.S. Chapter News

Columbia-Cascades

The Pacific Northwest Laboratory and the Columbia-Cascades Chapter have set up a risk analysis mailing list on the Internet computer network as a service to the international risk analysis community. Chapter member Charles R. Watson and Jeffrey P. Nye, both of the laboratory, personally initiated setting up the list called RISKANAL.

One of the project's main goals is to give individuals from diverse disciplines and countries the opportunity to exchange information and methodologies for risk analysis.

For information on contacting RISKANAL, see the article on page 8. To inquire about the list, call the chapter president (see box on this page).

Lone Star

The Lone Star Chapter met in June and heard Timothy Bingman of DuPont Corporate Remediation Group present the topic "Managing Uncertainty in Risk Assessments." He volunteered to make another presentation in the fall on Monte Carlo techniques and applications.

The chapter will hold a business meeting in September to address the election of new officers and plan chapter activities for the fall.

Metropolitan Chapter

The Metropolitan Chapter (Connecticut-New Jersey-New York) is holding elections in June for president, president-elect, secretary, and two councilors. Jill Greenberg of Meridian Environmental Resources is chairing the nominating committee.

The chapter is planning meetings in the fall on the topics of multiple chemical sensitivity and electric and magnetic fields. The membership will receive program notices by the end of August.

New England

Chapter member Harlee Strauss of H. Strauss Associates Inc. in Boston is editing a cooperative newsletter for the SRA New England Chapter and Boston Risk Assessment Group as a line of com-

U.S. Chapter Contacts

Columbia-Cascades: Jim Dukelow, president, telephone (509) 372-4074, e-mail js_dukelow@pnl.gov.

East Tennessee: Joe Minarick, president, (615) 481-2117.

Greater Pittsburgh: Gregg Claycamp, president-elect, (412) 967-6524.

Lone Star: Ruth Thompson, secretary, (713) 586-5661.

Metropolitan: Miriam de Salegui, president, (212) 749-7961.

Michigan: Betty Locey, president, (810) 344-2663.

National Capital Area: Rebecca Klemm, president-elect, (202) 667-5244.

New England: Alan Eschenroeder, president, (617) 259-0886.

Northern California: Tom McKone, acting secretary, telephone (510) 422-7535, e-mail mckonel@llnl.gov.

Ohio: Jon Reid, president, (513) 558-1723.

Philadelphia: Michael Jayjock, president, (215) 641-7480.

Research Triangle: Annie Jarabek, president, (919) 541-4847.

Rocky Mountain: Dennis Smith, president, (303) 933-8875.

Southern California: Mardy Kazarians, president, (818) 242-0401.

munication for the local membership. One function of the two-page letter is to list local job openings.

At the chapter meeting in May, independent consultant Katherine von Stackelberg in affiliation with Alanova Inc. in Lincoln, Massachusetts, spoke on "Videomapping Using Desktop Animation: A Tool for Risk Communication." Also, the chapter's president Alan Eschenroeder of Alanova Inc. presented the topic "Risk Assessment of Industrial Fog as an Accident Cause on Interstate 75 in Calhoun, Tennessee."

In June the chapter heard Michael Hutcheson of the Massachusetts Department of Environmental Protection, who spoke on "Department of Environmental Protection Methodology for Evaluating Human Health Risks from Exposures to Petroleum Hydrocarbons," and Elena Gurchich of the U.S. Agency for International Development in Moscow, Russia, who addressed "Environmental Pollution in Russia and Its Effects on Public Health."

Northern California

A dinner meeting to reactivate the Northern California Chapter attracted 35 attendees from the San Francisco Bay area and as far away as Sacramento. The highlight of the evening was a joint presentation by the chapter's first president and former Society president D.

Warner North of Decision Focus Inc. and Kenneth T. Bogen of Lawrence Livermore Laboratory on the National Academy of Sciences report "Science and Judgment in Risk Assessment." Both served on the committee that prepared the report.

Chapter President Allan H. Smith of the University of California at Berkeley and Secretary Thomas E. McKone of Lawrence Livermore National Laboratory are organizing future activities. A nominating committee is preparing a mailing list for the upcoming elections.

Southern California

More than 130 persons attended the Seventh Annual Workshop of the Southern California Chapter held at the University of Southern California in May. The workshop, titled "Current Issues in Risk Management and Human Health," included two parallel sessions focusing on health risk assessment and risk-based regulation and on episodic events from the perspectives of risk assessment as used in different industries and as viewed by stakeholders.

Cosponsors included the university's Institute of Safety and Systems Management, Unocal Corporation, PLG Inc., IT Corporation, Engineering-Science Inc., TRW Inc., and the Society of Toxicology's Southern California Chapter.

SRA Specialty Groups

Planning Session Held for Dose-Response Group

The first meeting to discuss the formation of a new specialty group on dose-response assessment within the Society for Risk Analysis was held via a telephone conference call that Michael Dourson of the U.S. Environmental Protection Agency in Cincinnati, Ohio, initiated and moderated. Members of the working group who were recruited to consider forming the specialty group addressed topics such as the Society's need for a dose-response specialty group, the group's mission statement and bylaws, and the possibility of establishing the group in time to plan dose-response sessions for the SRA 1994 Annual Meeting.

The working group was in favor of establishing a dose-response specialty group and at its next meeting will discuss in more detail a mission statement, bylaws, and the procedure for obtaining the SRA Council's approval. Anyone interested in participating in the discussions should contact Dourson by telephone (513) 569-7533 or by fax (513) 569-7916.

Ecological Risk Assessment Specialty Group

The Ecological Risk Assessment Specialty Group Chair Laura A. Haselow requests that the group members contact her to suggest topics for sessions at the SRA 1994 Annual Meeting.

For information about participating in the specialty group, contact Haselow at Westinghouse Savannah River Company, Environmental Restoration, 1995 South Centennial Avenue, Building 4, Aiken, SC 29803, telephone (803) 644-6766, fax (803) 644-6922.

Risk Communication Specialty Group

Practitioners, especially in industry, are the target audience for a listing of risk communication references that the Risk Communication Specialty Group initiated at its meeting last December. Steven Lewis of Exxon Biomedical in East Millstone, New Jersey, who is a member of the group and also chairs the SRA Publicity Committee, was instrumental in identifying the target audience. In addition, SRA Councilor Caron Chess and Nevin Cohen, both of Rutgers University's Center for Environmental Communication in New Brunswick, New Jersey, the group's chair Ann Fisher, and Lewis outlined the need for an annotated "short list" of the most useful references on practical issues in risk communication.

Lewis has arranged for a Chemical Manufacturers Association grant to support the reference list project. A steering committee of specialty group members will oversee the effort.

This initiative dovetails with a request published in the last issue of RISK newsletter for the group's members to contribute five key references, which will be the starting point for a practitioner-oriented short list.

The project's next step is to request input from SRA members in general about which references would be most helpful. Please send suggestions to Ann Fisher, Department of Agricultural Economics and Rural Sociology, Pennsylvania

State University, 107 Armsby Building, University Park, PA 16802, telephone (814) 865-3143, fax (814) 865-3746, Bitnet e-mail ANF1 @ PSUVM or Internet e-mail anf1@psuvm.psu.edu.

Exposure Assessment Specialty Group

The International Society of Exposure Analysis (ISEA) has elected to hold its 1996 annual meeting jointly with the Society for Risk Analysis Annual Meeting. Both societies hope this will improve the exchange of information on human exposure assessment between their memberships.

Thomas E. McKone, who is an ISEA councilor and the SRA Exposure Assessment Specialty Group's secretary/chair-elect, is the technical program chair representing ISEA for the joint meetings. To facilitate planning, he also serves on the SRA Meetings Committee.

McKone is in the process of organizing an ISEA Technical Program Committee for the joint meetings and invites volunteers to contact him (see address below).

The specialty group's Monte Carlo case book project is also under way. Those interested in contributing can contact the group's chair Robert Fares (see address below) or Paul Price, ChemRisk, 1685 Congress Street, Portland, ME 04102, telephone (207) 774-0012, fax (207) 774-8263.

For more information about the specialty group, contact Robert Fares, Versar Inc., P.O. Box 1549, Springfield, VA 22151, telephone (703) 642-6863, fax (703) 642-6954 or Thomas E. McKone, Lawrence Livermore National Laboratory, P.O. Box 808, L-453, Livermore, CA 94551, telephone (510) 422-7535, fax (510) 423-6785, e-mail mckone1@llnl.gov.

Engineering Specialty Group

The Society for Risk Analysis has accepted the terms of a renewable, three-year agreement between SRA and the American Society of Mechanical Engineers' Safety Engineering and Risk Analysis Division regarding *Risk Analysis: An International Journal*, says SRA Engineering Specialty Group Chair Robert J. Mulvihill.

Under the agreement, the ASME division members may subscribe to *Risk Analysis*. The division's newsletter will advertise the offer on a regular basis to its 5,400 subscribers.

The ASME division has asked Mulvihill, a current member of the *Risk Analysis* editorial board, to recruit papers from division members for publication in the journal. SRA will consider an option in the agreement to add a new member designated by the division to the editorial board.

The specialty group is planning at least one engineering session for the SRA 1994 Annual Meeting in Baltimore and requests suggestions from interested members. Contact Robert J. Mulvihill, PRC Inc., 222 N. Sepulveda Boulevard, Suite 1310, El Segundo, CA 90245, telephone (310) 640-1050, ext. 117, fax (310) 640-2207.

Risk-Related Happenings

Risk Analysis Mailing List on Internet

The Pacific Northwest Laboratory in Richland, Washington, and SRA's Columbia-Cascades Chapter have initiated a mailing list on the Internet computer network devoted to risk analysis. Subscribers to the mailing list—called RISKANAL—will receive any messages sent to the list either periodically in digested form or immediately upon receipt and can choose which form of the list they want to receive. The mailing list is moderated (i.e., immoderate or inappropriate postings are filtered out) to reduce e-mail "noise" and to better comply with the list's goals.

The list's administrators define risk analysis quite broadly, and appropriate postings on the subject may include news items of interest, meeting announcements, calls for papers, requests for information, answers to those requests, job opening descriptions, announcements of the availability of software or preprints, etc.

To ask questions about RISKANAL, contact Columbia-Cascades Chapter President James Dukelow by telephone (509) 372-4074 or by e-mail js_dukelow@pnl.gov.

To subscribe to RISKANAL, send the following message to e-mail listserv@voglnp.pnl.gov:

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subscribe riskanal first name last name
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To send a message to RISKANAL, contact e-mail riskanal@voglnp.pnl.gov. All list subscribers will receive messages that are sent to this address. Messages should not exceed 500 lines. Please divide long messages into multiple short messages.

New Member Joins Risk Commission

A new member has joined the federal Risk Assessment and Management Commission, which has begun work after a two-year delay.

President Clinton appointed Sheila McGuire, the founder and president of the Iowa Health Research Institute in Boone, Iowa, to the commission in June. The institute is a private firm that researches medical patient records to see what treatments worked best. (See next newsletter for profile of McGuire, who replaces former commission member Barbara Bankoff.)

At their June meeting, commission members heard presentations from risk analysis professionals, including SRA members Adam Finkel, Roger McClellan and Deborah Stine and SRA Distinguished Award recipient Sheila Jasanoff on the National Academy of Sciences' report "Science and Judgment in Risk Assessment."

The goal of the commission is to investigate the policy implications and appropriate uses of risk assessment and risk management in regulatory programs.

The commission's upcoming meetings, which are open to the public, are scheduled for Friday, July 30, at the Hyatt Regency on New Jersey Avenue in Washington D.C., and for September 9 at a location to be decided. For information,

contact the commission's program specialist, Joanna Foellmer, at (703) 308-8087.

Michigan to Sponsor Risk Symposium

Several organizations from the state of Michigan will sponsor a risk analysis symposium in 1995 to provide decision-making authorities, including nuclear facility emergency managers and government and senior public officials who are responsible for responding to nuclear power plant emergencies, with information on determining proper protective actions and the risks associated with radiation exposure versus non-radiological risks. The symposium also will examine and discuss the assumptions and methodologies underlying the U.S. Environmental Protection Agency's EPA-400-R-92-001 protective action guides and risk assessment.

The symposium will be held on May 18-19, 1995, at Michigan State University's Kellogg Conference Center in East Lansing. The invited speakers will present topics such as the basis for risk, the socio-economic impact of different protective action strategies, the uncertainties in dose calculation models, protective action modeling considering all risks involved, and the possibility of deriving a formula that goes beyond simplistic decision trees.

For more information, contact Michael Lindell of Michigan State University at telephone (517) 353-8855.

SRA Affiliates with Publication and Society

In 1995 the Society for Risk Analysis membership renewal form will provide an option to subscribe to the quarterly *Risk: Health, Safety, & Environment*. Several SRA members are on the editorial advisory board of the publication, previously titled *Risk: Issues in Health and Safety* in 1990-93. The quarterly frequently publishes the writings of SRA members.

Editor-in-chief Thomas G. Field Jr. proposed the subscription arrangement to the Society, and the SRA Council accepted his proposal at its meeting in April. The quarterly's current annual subscription rate is \$30.

In another new affiliation, SRA will offer *Risk Analysis: An International Journal* subscriptions to members of the American Society of Mechanical Engineers' Environmental Safety and Risk Assessment Division and will invite division members to submit papers for publication in the journal (see Engineering Specialty Group report on page 7).

Call for Posters on Chemical Mixtures and Quantitative Assessment

The U.S. Environmental Protection Agency's Health Effects Research Laboratory of Research Triangle Park, North Carolina, has issued a call for posters for its second annual symposium on November 7-10, 1994, at the North Raleigh Hilton in the vicinity of Research Triangle Park.

The symposium's purpose is to identify current chemical mixtures research, critical data needs, and important future

research directions and to provide an opportunity for active dialogue on the role of mechanistic research on chemical mixtures in future risk assessment strategies.

The symposium committee encourages participants to present posters on topics related to the symposium's theme of "Chemical Mixtures and Quantitative Risk Assessment" and will accept abstracts of either original or previously presented posters on the basis of space availability. Abstracts will be due by August 15, 1994.

For abstract submission or meeting information, contact the RSD Conference Coordinator, Health Effects Research Laboratory, U.S. Environmental Protection Agency, Mail Drop 70, Research Triangle Park, NC 27711, telephone (919) 541-5193, e-mail meeting@mail@herl45.herl.epa.gov, fax (919) 541-4002.

Indoor Air Research Proposals Accepted

The Center for Indoor Air Research is accepting applications for its postdoctoral fellowship program and research funding. The center is an independent, non-profit corporation that sponsors research on indoor air issues.

The center is accepting applications for its postdoctoral fellowship program awards until October 31.

The annual deadline to apply for research funding is June 1, but the center will accept proposals submitted after the deadline and will consider them the following year. The funding of awarded projects will begin on January 1 following the year that the application is accepted.

For more information contact Center for Indoor Air Research, 1099 Winterson Road, Suite 280, Linthicum, MD 21090, telephone (410) 684-3777, fax (410) 684-3729.

1995 ASME International Conference To Include Risk Topics

The American Society of Mechanical Engineers will sponsor its Fifth International Conference on Radioactive Waste Management and Environmental Remediation on September 3-9, 1995, at the Inter-Continental Conference Center in Berlin, Germany. The major program tracks will be low to intermediate-level waste management; high-level waste, spent fuel, and nuclear material management; environmental remediation and facility decontamination and decommissioning; and major institutional issues in environmental management.

The deadline for abstract submission is July 15, 1994; however, the general conference chair will *consider* post-deadline requests to submit an abstract.

To ask questions about the technical program or offer assistance with the conference, contact the general conference chair Steven C. Slate, Battelle Pacific Northwest Laboratory, MSIN K1-19, 902 Battelle Boulevard, P.O. Box 999, Richland, WA 99352, telephone (509) 375-3903, fax (509) 375-5963, e-mail sc_slate@pnl.gov.

To receive conference mailings or register to attend, contact Leslie Friedman, ASME Headquarters, 345 East 47th Street, New York, NY 10017-2392, telephone (212) 705-7788, fax (212) 705-7856.

Risk-Based Waste Classification Symposium

The National Council on Radiation Protection and Measurements will conduct a one-day symposium on "Radioactive and Mixed Waste—Risk as a Basis for Waste Classification" at the Sheraton Desert Inn in Las Vegas, Nevada, at 8:30 a.m., Wednesday, November 9, 1994. Professor Emeritus Dade W. Moeller of Harvard University in Boston, Massachusetts, will serve as the meeting's rapporteur.

"The symposium has been specifically designed to provide an opportunity for members of the public to hear and learn about, and to have input into, the development of a risk-based system for classifying radioactive and toxic chemical wastes," Moeller explained in a letter to RISK newsletter. "If we are successful, one of the outcomes of the symposium will be the identification and assignment of priorities to the key issues related to the formulation of such a system."

SRA Fellows B. John Garrick of PLG Inc. in Newport Beach, California, and Arthur C. Upton, who is a professor emeritus of New York University in New York City, will be among the symposium session leaders.

Participants should register by September 15 to attend. For information contact Laura Atwell of the National Council of Radiation Protection and Measurements at telephone (301) 657-2652 or Moeller at (919) 633-3352.

Hazards Reduction Fellowship Offered

The Earthquake Engineering Research Institute in a cooperative agreement with the U.S. Federal Emergency Management Agency is offering a \$30,000 fellowship for a practicing professional to gain greater skills and broader expertise in earthquake hazards reduction. Applicants must provide a detailed work plan for a six-month research project that would commence in January 1995.

The deadline to submit all application materials is September 16, 1994. Request application forms from the Earthquake Engineering Research Institute, 499 14th Street, Suite 320, Oakland, CA 94612-1902, telephone (510) 451-0905, fax (510) 451-5411.

National Committee Releases Radon Report

The National Research Council Committee on Health Risks of Exposure to Radon, which is also known as BEIR VI, released a report in June on its considerations of recent data and current studies concerning the risk associated with human exposure to radon. The four-member committee, chaired by Jonathan M. Samet of the University of New Mexico in Albuquerque, convened in August 1992 at the request of the U.S. Environmental Protection Agency to determine whether there was enough information to proceed with a comprehensive re-analysis of health risks associated with radon.

The Committee's report titled *Health Effects of Exposure to Radon: Time for Reassessment?* is available for \$24, plus \$4 shipping, from the National Academy Press, 2101 Constitution Avenue, NW, Box 285, Washington, DC 20055, toll-free telephone (800) 624-6242 (for all 50 states and Canada), telephone (202) 334-3313, fax (202) 334-2451.

Readers' Assessments

Dear Editor:

Thank you for sending me a copy of your newsletter. I always enjoy getting home to Tennessee and I am glad that my trip provided you an opportunity to cover my press conference.

As you know, protecting our natural resources while allowing for economic growth is a priority for this Administration. In fact, we are committed to "reinventing" environmental protection to ensure maximum protection of public health and the environment, while minimizing cost. This Administration is seeking new ways to prevent pollution before it happens and manage whole ecosystems, rather than small disparate pieces of natural habitat.

Thanks again for getting in touch. Congratulations on the success of RISK newsletter, and keep up the good work.

—Al Gore
U.S. Vice President

Dear Editor:

As part of my dissertation at Michigan State University, I am evaluating the role that science and environmental educators can play in teaching risk to students in the 6th through 12th grades. I believe that formal education can help prepare citizens for making decisions involving health and environmental risks.

I currently am identifying existing instructional materials targeted at enabling science and environmental educators to teach their students about various aspects related to decisions involving health and environmental risks. For example, I have gathered information on the University of California-Berkeley's Chemical Education for Public Understanding Program, which is a lesson unit for eighth-grade students that includes a module on risk comparison.

I would like to invite all RISK newsletter readers to share with me any information they have on risk education materials for middle and high school students. My address is:

Michaela Zint
Michigan State University
334 Natural Resources Bldg.
East Lansing, MI 48824-1222
Telephone (517) 353-9748
Fax (517) 353-6496
e-mail zintmich@student.msu.edu

When my report is complete, I will be glad to share my findings with others.

—Michaela Zint
Michigan State student

Send letters to the editor to Readers' Assessments, RISK newsletter, 1303 Wilson Road, Knoxville, TN 37912, fax (615) 691-0229, e-mail abbott@usit.net.

Calendar of Events

September 13-17. **International Symposium on Assessing and Managing Health Risks from Drinking Water Contamination: Approaches and Applications**, Istituto Superiore di Sanita, Rome, Italy. Contact Eric G. Reichard, U.S. Geological Survey, Water Resources Division, 5735 Kearny Villa Road, Suite O, San Diego, CA 92123, telephone (619) 637-6834, e-mail egreich@s101pcasnd.wr.usgs.gov.

September 18-21. **Joint Conference of the International Society for Environmental Epidemiology and the International Society for Exposure Analysis**, Sheraton Imperial Hotel, Research Triangle Park, North Carolina. Contact Phylliss Woody, Registrar, University of North Carolina School of Public Health, Office of Continuing Education, telephone (919) 966-4032, fax (919) 966-5692.

October 23-27. **Sixth North American International Society for the Study of Xenobiotics Meeting**, North Carolina State University's Continuing Education Center, Raleigh, North Carolina. Contact 6th North American ISSX Meeting, c/o Department of Toxicology, Box 7633, North Carolina State University, Raleigh, NC 27695, telephone (919) 515-2274, fax (919) 515-7169.

October 30 - November 3. **Fifteenth Annual Meeting of the Society of Environmental Toxicology and Chemistry**, Colorado Convention Center, Denver, Colorado. Contact SETAC, 1010 North 12th Avenue, Pensacola, FL 32501, telephone (904) 469-1500, fax (904) 469-9778.

October 31-November 3. **Conference on Applied Environmental Assessment: Site Characterization and Risk Assessment**, Sheraton Plaza Hotel, Orlando, Florida. Contact Sue Huckaba, Oak Ridge National Laboratory, P.O. Box 2008, Bldg. 7509 - MS 6383, Oak Ridge, TN 37831-6383, telephone (615) 576-2100.

Advertisement

Health and Environmental Scientists

Sciences International Inc., a dynamic health and environmental sciences consulting company with a mission of applying scientific excellence to real world problems, is hiring at all levels. Located in the Washington, D.C., metropolitan area with an office in Washington state, we are seeking experts in the following areas:

Human Health Risk Assessment—Senior and mid-level staff with backgrounds in toxicology and health sciences to work on site-specific hazardous waste site assessments as well as risk assessment methodology development.

Ecological Risk Assessment—Senior and mid-level staff to support terrestrial and aquatic risk assessment activities. Current need for an experienced specialist in fresh water aquatic systems.

Environmental Scientists—Junior and mid-level staff with experience in evaluation of fate and transport at hazardous waste sites. Particular current need for an experienced air modeler.

Please send resume to:

Science International Inc.
King Street Station
1800 Diagonal Road, Suite 500
Alexandria, VA 22314

An Equal Opportunity Employer

Advertisements

University of Alberta Academic Position in Health Risk Assessment/ Environmental Chemistry/Toxicology

Applications are invited for a tenure-track position at the assistant professor level in the environmental health sciences with an emphasis on human exposure assessment to environmental contaminants, toxicology and health risk assessment. Interested candidates should have a strong research background in quantitative trace contaminant measurement and analysis with some training or experience in the life sciences. Training or experience in industrial hygiene would be an asset. The position will be affiliated with the Eco-Research Chair in Environmental Risk Management, located within the Environmental and Occupational Health Programs of the Faculty of Medicine.

Candidates will be expected to develop an active laboratory-based research program in areas such as novel methods of contaminant exposure assessment, biomarkers, toxicity-directed analytical approaches or quantitative risk assessment; perform in a collaborative interdisciplinary research environment; teach in the areas of environmental chemistry, contaminant exposure assessment, health risk assessment or introductory toxicology; and participate in the training of graduate students. The current salary range for assistant professor rank is \$40,035 to \$57,003 with the appointment level being commensurate with qualifications and experience.

Complete applications should be received by September 15, 1994. Effective date of employment is expected to be January 1, 1995 or a mutually negotiated date.

In accordance with Canadian immigration requirements, priority will be given to Canadian citizens and permanent residents.

A letter of application accompanied by a full curriculum vitae, a description of research interests, and full names, addresses, and telephone and fax numbers for three referees should be directed to: Dr. Steve E. Hrudey, Eco-Research Chair in Environmental Risk Management, Environmental Health Program, Faculty of Medicine, 13-103 Clinical Sciences Building, University of Alberta, Edmonton, Alberta T6G 2G3, telephone (403) 492-6807, fax (403) 492-0364.

The University of Alberta is committed to the principle of equity in employment. The University encourages applications from aboriginal persons, disabled persons, members of visible minorities and women.

Regulatory Toxicologist

The Toxicology & Risk Assessment Section of the Texas Natural Resource Conservation Commission, located in Austin, Texas, has openings for health scientists specializing in Regulatory Toxicology.

The ideal candidate will possess an M.S. or Ph.D. degree in toxicology or a closely related field and will have a minimum of one to three years or more experience conducting human health risk assessments. The positions offer an opportunity to interface between science and policy management in a regulatory setting. Candidates will join a team of 20 toxicologists and must have demonstrated ability to work as a team member. Excellent oral and written communication skills are required.

Interested applicants should contact Laurie Couture Haws at telephone (512) 239-1789.



LEONARD H. ROLLER, INC.
Communications Management

"The first and probably most important step in effective Risk Assessment and Risk Management is to establish Public Participation that involves all the stakeholders."

Building Consensus Through Risk Assessment
National Research Council, 1994

One of the biggest challenges facing Risk Analysis Professionals now and in years to come is the challenge of explaining what you do and what it means to confused, angry, and fearful stakeholders on the local, state and national levels.

ANNOUNCING . . .

**BEYOND DATA: A 'HOW-TO' Workshop of Practical
Techniques for Communicating Risk**
October 18-19, 1994
Chicago

. . . *a new approach to risk communications*
focusing on practical, step-by-step methods to address real-world situations, with eye-opening presentations by professional psychologists, environmentalists, media and spoken communications experts.

"BEYOND DATA" has been designed specifically for Risk Assessment Professionals by Leonard H. Roller, a recognized national authority on the communication of risk and trainer of technical personnel at DOE facilities including Hanford, Rocky Flats and Fernald. This workshop will give you the tools you need to communicate more effectively with *any* audience.

The registration fee is \$695 (\$595/government). Participants will receive a Workshop Manual and a copy of *The Profits of Persuasion* by Leonard H. Roller. The Workshop will be held at the Hotel Sofitel Chicago. For reservations, call 708-678-4488 and reference the Communications Workshop.

For more information, please contact the Workshop Coordination Office at 312-988-7667 (FAX 312-649-9383).

REGISTRATION FORM

BEYOND DATA: A "HOW-TO" Workshop of Practical
Techniques for Communicating Risk
October 18-19, 1994 • Hotel Sofitel Chicago

Name _____

Title _____

Affiliation _____

Address _____

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Phone _____ FAX _____

Please register me for the Risk Communications Workshop.

My registration fee of \$ _____ is enclosed.

A government purchase order for \$ _____ is enclosed.

Workshop Registration Fee: \$695 (government rate \$595)
Checks should be made payable and sent to Conference & Publication Services, Ltd., 1715 N. Wells St., Suite 34, Chicago, IL 60614. Phone: 312-988-7667 FAX: 312-649-9383



RISK newsletter
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Risk Courses

August 15-19. **Occupational and Environmental Radiation Protection**, Harvard School of Public Health, Boston, Massachusetts. Contact Kathryn Lord, Harvard School of Public Health, Office of Continuing Education, 677 Huntington Avenue, LL-23, Boston, MA 02115-6023, telephone (617) 432-1171, fax (617) 432-1969.

August 22-26. **Advanced Workshop on Occupational and Environmental Radiation Protection**, Harvard School of Public Health (see August 15).

August 29-30. **New Horizons in Risk Assessment**, Hyatt Regency, Arlington, Virginia. Sponsored by SRA. Contact course coordinator Mary Oran at telephone (615) 376-6844 or course director Curtis Travis at (615) 576-2109.

September 27-30. **Analyzing Risk: Science, Assessment and Management**, Harvard School of Public Health (see August 15).

October 4 - November 22. **Environmental Impact Assessment: Process and Procedures**, Robert F. Wagner Graduate School of Public Service, New York, New York. Eight sessions on Tuesdays, 6:10-7:50 p.m. Contact Rae Zimmerman, Robert F. Wagner Graduate School of Public Service, New York University, 4 Washington Square North, New York, NY 10003, telephone (212) 998-7432 or -7450.

SRA Seeks Workshop Proposals For Meeting

The Society for Risk Analysis Conferences and Workshops Committee, whose chair is SRA Councilor Yacov Y. Haimes, has issued a call for SRA 1994 Annual Meeting workshop proposals on select topics in risk analysis.

Interested lecturers should submit a workshop prospectus of one or two pages to Yacov Y. Haimes, Center for Risk Management of Engineering Systems, Thornton Hall, University of Virginia, Charlottesville, VA 22903, telephone (804) 924-3803, e-mail yyh4f@virginia.edu, fax (804) 924-0865.

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