

# RISK *newsletter*

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## Should there be an academic program offering a PhD in risk analysis?

A panel discussion chaired by John Graham, SRA Council member and Harvard University faculty member, addressed the above question at the Society's 1991 Annual Meeting in Baltimore without reaching a consensus. Representing the affirmative, Tony Cox of U S WEST Advanced Technologies and Cox Associates (Denver) argued that the availability of a PhD risk analysis program would protect qualified practitioners, set standards, define the field, promote research, and attract the best and brightest to the field.

In fact, he said, "there is a field of risk analysis" and it has largely developed outside academia, albeit with considerable input from individual academics. He believes that if universities were to offer good programs, they would be flooded with applicants and their graduates would be sought to attack "open research questions that are deep, real, hard, persistent, important, and cross-disciplinary."

Panelist Lester Lave, an economist at Carnegie-Mellon University, disagreed. The principal reason for producing PhD's, he said, is to fill academic jobs, and such jobs are in the basic disciplines. Everything that needs to be done in risk analysis can be done by people emphasizing risk analysis within established disciplines. Moreover, Lave did not feel that a separate risk analysis program would attract the best applicants, and, in any case, students should not be wooed from the basic disciplines.

Elisabeth Paté-Cornell of Stanford University agreed with Lave that risk analysts should have a solid background in an already recognized discipline; however, she supported the concept of a PhD program in risk analysis. She pointed out that promoting expertise in a specific discipline is the philosophy of her own department of Industrial Engineering, where the PhD candidates who choose to specialize in risk analysis are expected to have a master's degree in one of the classical engineering disciplines.

Panelist Halina Brown of Clark University argued that risk analysts would be much stronger professionally if they had strong backgrounds in both the physical sciences and the social sciences. "We need to bring together faculty who share these interests," she said. She pointed out that Clark University emphasizes that duality in its Environment, Technology, and Society Program, which offers both MA and PhD degrees and has the following four required core courses: Risk Assessment and Hazard Management, Limits of the Earth, Technology Assessment, and Quantitative Methods in Risk Analysis.

Brown noted that other interdisciplinary academic models exist, indicating that defining a common pool of knowledge for a PhD degree in risk analysis should be no more difficult than, for example, designing a curriculum for public health.

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## Society Issues Annual Meeting Call for Papers

### Abstracts Due June 26

The Call for Papers for the Society's 1992 Annual Meeting, to be held in San Diego December 6-9, was mailed in early April to all SRA members of record. The package includes instructions for abstract submittal, including the request that abstracts be submitted this year both as hard copies and as ASCII files on a computer disk. Anyone not receiving this information should contact the Secretariat, as the abstracts are due on June 26.

Douglas Orvis, program chairman for the meeting, reports that the number of concurrent sessions held during the meeting will be substantially reduced by including two extended poster sessions in the program schedule. The Society's specialty groups will be organizing oral sessions, but most papers not selected for the specialty group sessions will be presented as posters. With this format, attendees will have greater access to a larger number of papers and will also have more time to interact directly with the presenters.

In the overall meeting plan, each specialty group will be allocated about eight platform sessions (32 to 40 papers). On a pro-rata basis, each specialty group should also expect to be allocated about 40 poster positions. The technical committee is encouraging people to organize poster "sessions" in which several papers on one topic are grouped together.

As noted in the Call for Papers, the Risk Communication Group and the Exposure Assessment Group will each

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*This newsletter is printed on recycled paper.*

## PhD in Risk Analysis?

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Richard Wilson of Harvard University pointed out that the aim of a PhD risk analysis program would have to be decided upon before a curriculum could be designed. "It appears," he said, "that we want someone who is not narrow [in approach] but also someone who can think fundamentally about particular issues. If you have a separate department, you will lose the deep fundamental thinking in one subject."

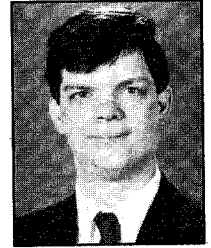
When a member of the audience remarked that most engineers felt that no more than a one-day course was needed to become a risk analyst, Tony Cox responded that many companies also have that attitude and they are investing money unwisely. If a PhD program in risk analysis were available, such companies would get a better job for less money, he asserted.

Halina Brown reiterated that the first task was to define a common pool of knowledge for the program, adding that she also felt that a PhD in risk analysis should probably be preceded by a masters degree in a particular discipline.

A member of the audience (from the USDA) stated that he had come to the SRA annual meeting to understand what risk analysts really do, and he was still waiting to discover the answer. Attempting to clarify the situation, a panelist described risk analysis as falling in two general categories—environmental health and engineering questions—but a Clark University student interjected that he had perceived "six or seven different camps" at the meeting.

## Tony Cox opted for PhD in risk analysis.

While Tony Cox was working on his PhD in the Department of Electrical Engineering and Computer Science at the Massachusetts Institute of Technology, he took courses in nuclear safety risk analysis, applied stochastic processes, and reliability engineering. These followed earlier graduate courses at Harvard University in applied probability and applied mathematics, theoretical and applied statistics, and decision sciences, all preceded by a bachelor's degree in mathematical economics. Upon graduation (in 1986), he was given the choice of a PhD in either risk analysis or operations research. He opted for risk analysis, having received an SM degree in operations research from the department the previous year. Asked during the 1991 panel discussion in Baltimore if he knew of anyone else with a PhD in risk analysis, Cox said no. It was concluded during the discussion that he may be the only holder of such a degree.



L. A. (Tony) Cox, Jr.

Another person from the audience agreed with Panelist Brown that in order to deal with risk problems both the physical sciences and social sciences are needed, stating that "a lot of the problem we have is the lack of marriage and understanding between the two. We should be developing a disciplinary approach that gives perspectives together."

Brown added, "Let's set aside the curriculum. I want to stress the benefit of creating a department that promotes collaboration on issues." She felt that it was a matter of creating the right atmosphere to attract a critical mass of people who want to tackle issues.

Chairman John Graham pointed out that universities are not organized to promote that type of interaction. There would have to be a lot of pressure from the outside world, but "we have not yet figured out how to exert that pressure."

Several persons in the audience, all appearing to be graduate students,

had varying opinions about an academic program in risk analysis. Several said they did not want to lose their disciplines, one stating that "risk analysis should be the bridging of the value of the sciences." At least one individual felt that a risk analysis program would attract students. Another, explaining that he had a masters degree in economics with some background in mathematics, said he was in the process of obtaining a masters degree in risk management from the University of Virginia.

Finally, a member of the audience presented a summarizing statement. "Twenty years ago," he said, "people used to have the same arguments about systems engineering. Now it is accepted. When you look at risk analysis, first of all, it is a philosophy. You might argue that you cannot restrict expertise to those who know the methodologies, but in 10 or 20 years this dialogue will stop being dichotomous. We will have people doing their job in the field."

## Rensselaer Offers New EMP Degree

Rensselaer Polytechnic Institute in Troy, New York, has established a new professional degree in Environmental Management and Policy (EMP). Students in the Institute's Center for Urban and Environmental Studies, established 23 years ago, now can elect to specialize in 45 credit hours of EMP studies for a graduate Masters of Science degree.

This applied program will combine aspects of environmental restoration and strategy—as well as energy efficiency and waste reduction—with the planning, decision making, and regulatory skills required in environmental policy to perform well in both government and business settings. The intention is to produce graduates who can deal with environmental and en-

ergy matters from a base of technical and managerial knowledge. The new program involves faculty and courses from the Schools of Management, Environmental Science, Engineering, and Humanities and Social Sciences.

For further information, contact Bruce Piasecki or Alexander Aldrich, Phone 518-276-6565.

## 1992 Annual Meeting

(Continued from Page 1.)

sponsor a series of oral sessions, the Ecological Risk Assessment Group and the Global Risk Analysis Group will jointly sponsor a series, and the Engineering and Applications Specialty Group and the Space Specialty Group will jointly sponsor a series.

### Risk Communication Sessions

The sessions on risk communication are being organized by Linda-Jo Schierow (202-707-7279). The group is soliciting papers on a number of topics, with session organizers specified for certain topics as follows:

*Risk Communication and the Public Health Service*, Mary Jo Deering, 202-472-5307.

*Risk Communication in California*, Karim S. Damji, 818-545-4747.

*Addressing Conflict in Risk Communication*, Judy Yager, 303-258-7888.

*How Citizens Obtain and Use Risk Information*, William Dickinson, 202-720-5369.

*Promoting Risk Avoidance Through Risk Communication*, Richard Rich and David Conn, 703-231-5323 or -6571.

*Evaluating Risk Communication Campaigns*, David Holtgrave, 404-639-1480.

Other topics to be considered are: communicating about food and drugs; communicating during emergencies; theoretical perspectives and empirical evidence in risk communication; risk communication in other nations; international communication about global risks: UNCED '92 and beyond; industry-citizen communication about risk; legal questions and concerns about risk communication; communicating with the masses: mass media; communicating scientific and technical information to the public; facilitating constructive communication about technical controversies; and environmental equity considerations in risk communication.

### Exposure Assessment

The Exposure Assessment Group sessions are being organized by Chairman Paul Price (207-774-0012) and Barbara Peterson (202-337-2625). The session topics will be as follows: EPA exposure guidelines: case studies of applications; Monte Carlo modeling of exposure; indoor air; residential exposures to pesticides by air, diet, and dermal exposures; environmental equity (Are poor people disproportionately exposed?); national surveys for assessing exposure—design, implementation, and analysis; and the use of institutional controls at hazardous waste sites.

### Ecological Risk Assessment

The Ecological Risk Assessment Group, chaired by Larry Barnhouse (615-574-7393), is soliciting abstracts on the following topics: Superfund ecological risk assessments; natural resource damage assessment; risk assessments for endangered species; uncertainty in ecological risk estimates; integration of health and ecological risks; global ecological risks; and ecological risk communication.

### Global Risk Analysis

Julian Lancaster, chairman of the Global Risk Analysis Group, which will be collaborating with the Ecological Risk Assessment Group, says his group will focus on integrated assessments, combining societal and environmental factors such as demographics, energy, water resources, storm impacts, disease vectors, and land use. The group will also address the risks to populations resulting from global warming. (Lancaster can be reached at 617-496-1457.)

### Engineering and Applications/Space

The Engineering and Applications Group and the Space Group are primarily interested in risk analysis and risk management of complex sociotechnical systems. The group is also striving to integrate the methods and results of the other specialty groups, e.g., exposure or risk communications. Development and applications engineering risk analy-

sis and management methodology to date has derived mainly from the nuclear, space and chemical processing industries. These industries are expected to be strongly represented at the 1992 meeting, together with other industries such as commercial air transport and oil tanker transport, manufacturing facilities, etc.

Hatice Cullingford (713-283-8229) is the coordinator of the jointly sponsored sessions of these two specialty groups and is organizing at least two space-oriented sessions. Anyone interested in risk-based approaches to space exploration should contact her. Suggested topics are: risk-based decision making in design and test engineering; use of robotics to reduce risk of human missions; and risk from space radiation to humans or equipment.

SRA's Southern California Chapter expects to build on the success of the 1991 International Conference on Probabilistic Safety Assessment and Management (PSAM) to organize several engineering and risk-management oriented sessions. Chapter President Bob Mulvihill (310-640-1050) is organizing a session on "Chemical Process Plant Risk"; Doug Orvis (619-592-0189) is organizing two sessions, one on organizational factors, safety culture and integrated risk management, and another on human factors in risk analysis; George Apostolakis (310-825-1300) is organizing a panel discussion during which managers from hazardous industries will describe how they use risk analysis, management, or communications; and Krishna Nand (818-585-6336) will coordinate a workshop on fundamentals of engineering processes and how they are represented in risk analysis. Anyone interested in any of the specific topics should contact the person listed. Anyone having other ideas for the sessions should contact Cullingford or Orvis.

General Chairman for the 1992 Annual Meeting is President-elect James Wilson (314-694-8879).

**1992 SRA Annual Meeting**  
**December 6-9**  
**Hotel del Coronado**  
**San Diego, California**

## 1991-92 Committee Chairs

President Warner North has affirmed that the following Society members are chairing SRA committees in 1991-92:

**Annual Meeting:** James D. Wilson, Monsanto Company, 800 N. Lindbergh Blvd., St. Louis, Missouri 63167 (Phone 314-694-8879; Fax 314-694-6858).

**Awards:** Richard C. Schwing, Operating Sciences Dept., General Motors Research Laboratories, 30500 Mound Road, Warren, Michigan 48090-9055 (Phone 313-986-1348; Fax 313-986-0574).

**Conferences & Workshops:** David B. McCallum, Columbia University, Center for Risk Communication, 1000 Potomac Ave., N.W., Washington, DC 20007 (Phone 202-338-2156; Fax 202-333-6316).

**Executive:** D. Warner North (see new address below).

**Finance:** Raymond F. Boykin, California State University, Chico, College of Business, Chico, California 95929-0011 (Phone 916-898-5895; Fax 916-898-4584).

**Gifts and Grants:** Elizabeth Anderson, Clement International Corporation, 9300 Lee Highway, Fairfax, Virginia 20231 (Phone 703-934-3500; Fax 703-934-3278).

**Governance:** Peter Barton Hutt, Covington & Burling, 1201 Pennsylvania Ave., NW, Washington, DC 20004 (Phone 202-662-5522; Fax 202-662-6291).

**Membership:** Ann N. Fisher, Pennsylvania State University, Dept. of Agricultural Economics and Rural Sociology, 201 Weaver Bldg., University Park, Pennsylvania 16802 (Phone 814-865-0469; Fax 814-865-3746).

**Nominations:** B. John Garrick, PLG, Inc., 4590 MacArthur Blvd., Suite 400, Newport Beach, California 92660-

2027 (Phone 714-833-2020; Fax 714-833-2085).

**Publications:** B. John Garrick (see address above).

**Publicity:** Hatice S. Cullingford, NASA Johnson Space Center, Lunar and Mars Exploration Program Office, Mail Code XE, Houston, Texas 77058 (Phone 713-283-8229; Fax 713-283-5818).

**Sections and Chapters:** Rae Zimmerman, New York University, Robert F. Wagner Graduate School of Public Service, 4 Washington Square North, New York, New York 10003 (Phone 212-998-7432; Fax 212-995-3890).

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

## Member News

**SRA Members Elected to NCRP.** Two SRA members are newly elected members and two are newly elected honorary members of the National Council on Radiation Protection and Measurements (NCRP). The results of the 1992 membership elections, which took place at the NCRP Annual Meeting on April 2, were announced on April 9. David Hoel of the National Institute of Environmental Health Sciences, Research Triangle Park, North Carolina, and John R. Johnson of Battelle Pacific Northwest Laboratories, Richland, Washington, are among nine new members. A. Alan Moghissi of the University of Maryland at Baltimore, Baltimore, Maryland, and Arthur C. Upton of the New York University Medical Center,

Tuxedo, New York, are among four honorary members of the Council.

**Robert G. Tardiff**, formerly with Versar, Inc., has become Vice President of the Health Sciences Group at EA Engineering Science and Technology, Inc. His new address is: Suite 500, 8401 Colesville Road, Silver Spring, Maryland 20910 (Phone 301-565-4216; Fax 301-587-4752).

### Pollution Tradeoff?

In her recent book with Lou Guzzo, *Trashing the Planet* (HarperPerennial, 1992), Dixie Lee Ray, former governor of Washington state and former chairman of the U.S. Atomic Energy Commission, discusses the polluting characteristics of the automobile. At the same time she recalls pre-automobile days, concluding that "Mr. Henry Ford made a greater contribution to public health than most practitioners of science by introducing an affordable auto—which led to the eventual elimination of horse manure from public streets." She has a point.

### 1988 SRA Proceedings Now Available

The proceedings for the 1988 SRA Annual Meeting, which was held in Washington, DC, have been published and are now available. The volume, the eighth in the series *Advances in Risk Analysis*, totals 778 pages and is entitled *Risk Analysis: Prospects and Opportunities*. It was edited by Constantine Zervos. Contributing Editors were Kathleen Knox, Lee Abramson, and Rob Coppock. First authors of the papers included in this volume should already be receiving their complimentary copies.

To order the 1988 proceedings or proceedings for earlier years, please mail a check (\$45 per copy) to Plenum Publishing Corp., ATTN: Mary Safford, 233 Spring Street, New York, New York 10013.

#### New Address for President Warner North

**Decision Focus, Incorporated**  
has relocated its Los Altos office to  
**650 Castro Street, Suite 300**  
**Mountain View, CA 94041-2055**  
**Phone 415-960-3450**  
**Fax 415-960-3656**

#### Correction

In the report from the Exposure Assessment Specialty Group on page 14 of *RISK newsletter*, First Quarter 1992, the professional affiliation of Alan Stern should have been the Division of Science and Research of the New Jersey Department of Environmental Protection and Energy.

## Reports from Strategic Planning Session

SRA President Warner North met with past SRA presidents and current officers and council members on March 12-13 in Washington, DC to discuss a number of topics related to growth in membership, breadth of activities, and funding. Two reports emerging from that meeting are given below.

### Ideas for Promoting SRA's Growth

A successful process for increasing the scope of areas addressed within SRA-supported activities and in attracting members to SRA from fields not strongly represented within the Society has been the organization of sessions by SRA specialty groups for the annual meetings. Notable examples include the strong participation by ecological analysts in the 1991 meeting and participation by NASA and the aerospace communities and the chemical industry in response to sessions organized in previous meetings. Similar efforts to attract new audiences to sessions dealing with global change and AIDS were judged to be much less successful. A recommendation was made for a thoughtful and focused effort to be made to identify timely or emerging issues that may bring new groups into SRA. Such topics may include regulations undergoing revision, i.e., RCRA reauthorization, or groups such as those working on natural hazards, public health, and industrial hygiene/occupational health. Members are asked to give suggestions to the Conferences and Workshops Committee for topics that fit this pattern.

It was also deemed desirable to support international scientific exchanges, especially in countries without technical strength in risk assessment, if funding for these activities could be found. The Conferences and Workshops committee (with help from Vlasta Molak and Warner North) should pursue prospects for funding from international agencies with environmental objectives, i.e., the United National Environment Program and the World Bank. Any SRA member with suggestions regarding people or agencies to contact in search of such support should contact Vlasta Molak at 513-533-8334 or Warner North at 415-960-3923.

A final suggestion was that, to the extent that SRA records permit, the Membership Committee be provided with a list of members sorted by employer. Members at companies, government organizations, universities or other organizations with a large pool of potential members would

be contacted and asked to do some recruiting. This effort could also be tied into an effort to improve recruiting of sustaining members.—Chris Whipple and Ann Fisher

### An Idea to Stimulate SRA Chapter Interest and Membership

The subject of the SRA chapters and how to better support them was discussed at length at the planning meeting. The leadership of SRA feels that the chapters are crucial to the success of the Society and wants to lend support to chapter efforts. It was concluded that at least one initial idea was worth serious consideration. That idea relates to the organization of joint meetings at the chapter/section level with other society sections or chapters on subjects or speakers of common interest. Experience with joint meetings has been very successful in a number of societies, and especially so at the chapter/section level.

Most of the SRA chapters are located in large metropolitan areas where there are a number of other professional society sections that are active. A screening of these societies should reveal a number of candidates for joint meetings. The broad interest of SRA in the health, social, and physical sciences, as well as such fields as law, economics, and the management sciences, provides an extraordinary opportunity for organizing exciting and timely meeting topics.

Each SRA chapter is encouraged to consider selected joint meetings with other society sections as a means of generating new interest in risk-related activities. Most of the chapter leadership will be contacted by one of the leaders of SRA to offer any assistance possible in giving this idea a try, such as providing contacts in other societies and obtaining speakers for such events. We hope that this will be a beginning of an effort to draw chapters closer to the Society's leadership. If you have any questions, contact John Garrick at 714-833-2020 or Rae Zimmerman at 212-998-7432.—Rae Zimmerman and B. John Garrick

## Workshops Organized on Global Risks

The Global Risk Analysis Specialty Group has been active this winter, with Chair Justin Lancaster organizing two workshops on global climate change.

A February workshop held at the University of California at San Diego focused on research on the human dimensions of global change, particularly public health assessment and economic vulnerability in the coastal regions.

In April, a group of experts on global warming policy and law met to discuss the climate convention negotiation at

the Vermont Law School. They agreed almost unanimously that some sort of legal convention would emerge from the Earth Summit being held in Rio de Janeiro, although the effectiveness of the treaty remains uncertain. (The Vermont Law School is also home to the Northeast Center for Comparative Risk.)

Both workshops were sponsored by the Environmental Science and Policy Institute (ESPI), which Lancaster heads, with assistance from the University of California at San Diego, the Vermont Law School, and Dartmouth College.

## Regional Center Working on Environmental Problems in Central and Eastern Europe

*(Editor's Note: Information for the following report on the Regional Environmental Center for Central and Eastern Europe [REC] now operating in Budapest, Hungary, was provided to RISK newsletter by REC staff member Marta Bonifert when she attended SRA's 1991 Annual Meeting. Speaking at one of the sessions, Bonifert said that President Bush visited Hungary in 1989 and announced U.S. intentions for helping people in Hungary and other countries in the region with their environmental problems by giving funds for an environmental center. The Center opened in September 1990 and was immediately deluged with lists of problems, some of which have been graphically reported in the June 1991 issue of National Geographic by Jan Thompson and James Nachtwey, "East Europe's Dark Dawn," p. 37.)*

The Regional Environmental Center for Central and Eastern Europe (REC) was established in Budapest, Hungary, in 1989, as a non-governmental, independent, not-for-profit organization seeking to address the environmental challenges common to the region that includes Bulgaria, Czechoslovakia, Hungary, Poland, Romania, and the republics formerly known as Yugoslavia. Recognizing that local as well as regional activities are necessary for resolving global environmental problems, REC encourages non-governmental organizations (NGOs), citizen groups, government agencies, international organizations, academia, industry representatives, and individuals to become involved and cooperate in finding solutions to those problems. REC's primary mission, however, is to strengthen the environmental community through the development and support of environmental NGOs.

REC is one of several initiatives implemented by the U.S. Environmental Protection Agency under the Support for East European Democracy (SEED) Act of 1989 as a direct result of the East European Environmental Initiative, announced by President Bush in May 1989. The SEED Act authorized \$5 million (US\$) over a three-year period (1989-92) to support REC, which also receives financial support from Austria, Canada, Denmark, the European Community, Finland, Hungary, Japan, The Netherlands, and Norway. Several business organizations and individuals also donate time and equipment to REC's environmental efforts.

According to Peter Hardi, the executive director of REC, the need for an environmental center was greater than anyone had anticipated. In the first eight months of operation, REC met with over 4000 visitors, reviewed more than 400 project proposals, and participated in

about 50 REC-related events. REC is engaged in four major areas of activity:

- **Data Collection and Dissemination.** REC's library/resource center provides access to environmental information through a developing collection of printed materials and established databases. REC is compiling a database of NGOs that had over 600 entries after the first eight months of REC's operation: approximately 300 regional NGOs, 100 western NGOs, and 200 scientific, governmental, and business groups. Other parts of the database include listings of universities, research institutes, large international NGOs, and 1500 environmental experts, scientists, activists, and journalists.

Addressing the region's lack of a communication system that would be capable of carrying environmental data and database information to NGOs and governments in the field, REC is developing RECnet, an electronic environmental communications network. RECnet will enable NGOs and others to access international data banks, investigate other environmental activities in the region, request the assistance of technical experts, and communicate with other groups having similar needs or knowledge, thereby placing REC's resources as close as possible to its primary target groups within the region. RECnet will provide the communication link for REC's Focus Points Network—several local REC offices staffed by two people, fluent in the respective local language, who ensure that REC programs are carried out in their area.

An integral part of the REC information network will be the Central Euro-

pean Environmental Data Request Facility (CEDAR), a part of the Austrian government's donation to REC. Located in Vienna, CEDAR will serve as a computerized data link between East and West and will supply REC and its Focus Point Network with an advanced environmental information network. REC is a member of CEDAR's executive body, the Society for the Operation of CEDAR (SOC), along with two other regular members of SOC, The Austrian Federal

Ministry of Environment, Youth and Family and The International Society for Environmental Protection (ISEP), both

located in Vienna.

- **Institutional Development.** To develop institutional capability, REC promotes public participation in environmental decision making as well as governmental and sectoral communication for policy planning, implementation, and enforcement of environmental laws. (For example, as a result of an NGO request for specific legal examples of western environmental laws, REC is sponsoring workshops to develop, advocate, and implement environmental legislation.) REC also encourages technology transfer and environmentally sound approaches toward development; analyzes environmental issues and data and develops approaches to environmental regulations and standards; and works to improve the regional capacity to study and understand environmental health effects and to integrate these health studies and resultant policies with environmental management approaches.

- **Education and Training.** The most common requests of NGOs have been for teacher training programs, assistance in developing curricula, and worker

**"Having a right to know your environment is becoming very important to countries."—Marta Bonifert, REC Staff Member.**

training on health and safety hazards. REC has sponsored many workshops throughout the region and hopes to conduct many more. A facility in Czechoslovakia has been donated to REC to use for implementing a full service training center for staff and NGOs. REC is also developing a mobile training vehicle, with a working lab and classroom, to demonstrate monitoring and computer modeling equipment and a rapid response vehicle for assessing environmental hazards on-site.

- **Clearinghouse.** REC seeks to match a variety of resources—such as assistance programs, exchange programs, fellowships, technical experts, and equipment—with appropriate recipients. As a part of this effort, REC has launched a Resources-Needs program to assess the technical talents and environmental needs of the region. Using an electronic database, requests for technical support will be matched to available resources. A two-part Resources-Needs form is the tool used to gather information from experts—both regional and international—who have resources, skills, expertise, or equipment they would like to offer and individuals or NGOs who need technical environmental assistance.

REC welcomes proposals for collaborative activities within and among the regional countries, as well as activi-

ties which combine regional and non-regional participants. One-year and multi-year grants are available through REC. Any request for REC facilitation, coordination, or funding of cooperative activities must be submitted in writing as outlined in REC's publication, "Proposal Guidelines."

REC also publishes the quarterly *Information Bulletin*, an informative communication of the news of REC, new REC programs and projects and updates on continuing ones, introductions to regional NGOs, upcoming conferences and reviews of past ones, awards granted and projects supported by REC, and other environmental activities in the region.



*The countries served by the Regional Environmental Center for Central and Eastern Europe (REC) are Poland, Czechoslovakia, Hungary, Romania, Bulgaria, and the republics that formerly formed Yugoslavia.*

To contact the REC, use the following address: Regional Environmental Center for Central and Eastern Europe, 1035 Budapest, Miklos Ter 1, Hungary (Phone 36-1-168-6284, -8203, -8685, or 9463; Fax 36-1-168-7851).

## Tasks Facing REC and Similar Organizations in Central and Eastern Europe

During the International Session chaired by Vlasta Molak at the 1991 SRA Annual Meeting, several representatives from Eastern and Central Europe gave their views on environmental problems in their regions and talked about how they might be solved. In the paragraphs below, *RISK newsletter* is attempting to capture the essence of their message; however, none of the comments should be construed as exact quotations.

**Márta Bonifert (Hungary).** Márta Bonifert is a biologist and a member of the Development Staff of the Regional

Environmental Center for Central and Eastern Europe (REC) in Budapest, Hungary (see preceding page). In describing the need for REC, she said the waste problems in the region are overwhelming. Waste disposal has been virtually unregulated throughout much of the region during the past 40 years, and the work of REC will be greatly complicated by the lack of reliable data for this period. The only criteria for industries were production quotas, which were attained with excessive energy consumption, incredibly high overhead costs, and no environmental concerns. She cited some examples of

problems in the REC-affiliated countries as follows:

**Czechoslovakia**—Up to now, losses to the national economy of Czechoslovakia have amounted to about \$5 billion per year from improper waste disposal. The country is now trying to develop a specific legal framework for waste management and reduction of pollution, realizing that the major limitation is inadequate technology for waste separation.

**Poland**—Importation of toxic wastes into Poland became a serious  
(Continued on page 8.)



*Representatives from several countries met with SRA President Warner North and SRA Secretary Vlasta Molak at the Society's 1991 Annual Meeting. Front Row: Smिता Siddhanti, India; Saburo Ikeda, Japan; Vlasta Molak. Back Row: Branimir Molak, Croatia; President North; Márta Bonifert, Hungary; and Karel Bláha, Czechoslovakia.*



*Todorka Hristova, from Bulgaria, and Naum I. Borodyansky, from The Ukraine, also attended the 1991 SRA Annual Meeting.*

## Tasks Facing REC

*(Continued from page 7.)*

problem—46,000 pounds in 1989. The root of this problem is that the inspectors lacked technical skills needed to identify the wastes and deny their entry. Greenpeace cited 80 firms in 13 countries sending waste to Poland. Within Poland, the wastes are often mislabeled and stored unsafely.

**Hungary**—100 million tons of industrial waste and 22 million cubic meters of municipal waste have been produced in Hungary. Until 1981, the collection, disposal and treatment of wastes in Hungary was extremely unregulated. Since 1981, laws have been requiring the construction of incinerators to dispose of certain wastes, but

there has been a public outcry against them because they have not been fully explained.

**Romania and Bulgaria**—Information to the public and environmental awareness in Romania are almost nonexistent. Throughout the country there are numerous chemical plants. Since 1950, a black environment has been created in the region around Copsa Mica by carbon black emissions from a plant producing substances for tires. Romanian leaders are now strongly considering establishing risk-based policies for waste disposal and pollution.

Plants built by Romania near its southern border are causing problems for Bulgaria, and international experts are being called in to deal with the complaints of the Bulgarians. Bulgaria, like Poland, is also suffering from the importation of toxic wastes.

**Karel Bláha (Czechoslovakia).** When he was attending the 1991 SRA Annual Meeting, the affiliation of Karel Bláha, a PhD, was given as the Institute of Hygiene and Epidemiology in Prague, Czechoslovakia, but he has since informed *RISK newsletter* that the organization has been renamed the Institute of Public Health.

Reporting on the history of the Institute, Bláha said its roots go back to 1926 when the National Institute of Health was established in Prague with

some support from the Rockefeller Foundation. It became well recognized in the field of public health but disintegrated in 1948, with some of the staff continuing work at other organizations. In 1971, the government established the Institute of Hygiene and Epidemiology by combining several research institutions of the Czechoslovakian Ministry of Health.

A major task of the new National Institute of Health, which will have five centers and will be involved in essentially all matters dealing with the health of Czechoslovakian citizens, will be to gain the faith of the people, Bláha says. Also, it must advance technologically. For example, while the Institute is procuring computers, most of the staff does not yet have the knowledge to develop computer programs. Also, they have a great need for reliable data.

Bláha's work is in the area of risk assessment, which includes hazard identification and exposure determination. Risk management and risk communication are largely the responsibility of others, the success of which, he emphasizes, will greatly depend on the development of a mutual trust between the government and the public.

Since returning to Czechoslovakia, Bláha has reported to *RISK newsletter* that he met on April 8 with about 15 colleagues in chemical safety to form a preliminary committee for the formation of an SRA chapter in his country. Also, he met on March 30 with Peter Preus from the U.S. Environmental Protection Agency to organize a course on risk assessment to be given in Czechoslovakia this year.

**Todorka Hristova (Bulgaria).** Todorka Hristova is an associate professor in the Bulgarian Academy of Sciences' Institute of Ecology in Sofia, Bulgaria. She reported on the use of chemical pesticides for pest control in Bulgaria and the large uncertainties introduced with the quick changes to democracy and private ownership of property.

The use of pesticides in Bulgaria began in 1939, and several years of using DDT advanced an enormous amount of optimism. But disappoint-



ments came as certain species developed resistance to pesticides and non-target organisms (fauna, foodstuffs, etc.) suffered from their use.

Bulgaria imports nearly all of its pesticides, and in the past a central supply of pesticides provided at least a modicum of control in their use. During 1990-91, however, the lack of currency and the reorganizations of essentially all systems within the country resulted in few pesticide imports. As private companies emerge, they will undoubtedly resume imports of pesticides for first-time private landowners with little or no experience in their use. It is essential, Hristova believes, for a nation-wide risk management program to be developed for pesticide use.

That system, Hristova proposes, should include local regulation and control, a set of rules for risk management, strict controls on toxicities and applied dosages, techniques to protect the environment and wild fauna, and training systems for those working in the field. These steps will be necessary, she says, to protect public health and to preserve genetic funds.

**Branimir Molak (Croatia).** Branimir Molak, a nuclear physicist and reservoir engineer with experience in energy planning and emergency management, pointed out that the political

conditions existing in the former republics of Yugoslavia, including his native Croatia, were not currently conducive to thinking about environmental problems. That was in December, and since then the situation has worsened considerably. Most people are concerned with the risks of not having adequate shelter, food, or energy supplies and other consequences of war.

Nevertheless, environmental problems are mounting in these republics, particularly because of the war. Chemical plants have been destroyed, and oil and gas fields have been attacked. Power plants have been damaged and transmission lines have been interrupted.

In a letter dated in early April, Molak wrote "In Zagreb, it is quiet, but very close heavy guns are at work. Unfortunately, this will take more and more human lives." Sadly, from newspaper accounts in the U.S., that is an analysis of a risk that has a high probability of occurring.

**Naum I. Borodyansky (The Ukraine).** Naum I. Borodyansky, a PhD with the Glushkov Institute of Cybernetics, at the Academy of Sciences of the Ukraine (in Kiev), also attended the International Session at the 1991 SRA Annual Meeting. He is the scientific secretary of the Kiev Informatics De-

partment and will be SRA President Warner North's host when he visits the city of Kiev in early June.

### Addresses

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## Kharkov Risk Analysis Conference Rescheduled

The International Conference on Uses of Risk Analysis in Evaluating and Solving Environmental Problems, originally scheduled to be held in Kharkov in the Ukraine in May 1992 [see September 1991 RISK newsletter], is now scheduled for May 24-27, 1993.

The purpose of the conference, which is sponsored in part by the Kharkov Institute of Physics and Technology, is to enable participants from all parts of the world to exchange information and technology dealing with the evaluation of and solution to environmental problems, emphasizing west-east and north-south interactions. The conference will deal with risk analysis and also will present exhibitions and demonstrations of methods and technologies to prevent and control pollution.

SRA members are encouraged to offer their support to make the conference a success. For more information, contact Vlasta Molak, Bio-technology Forum, Inc., 8987 Cotillion Drive, Cincinnati, Ohio 45231 (Phone or Fax 513-521-0506).

## Kharkov Environmental Professionals Visit Sister City, Meet SRA President

Four environmental professionals visited the U.S. from February 27-March 12, 1992, as guests of the Environmental Committee of the Cincinnati-Kharkov Sister City Project, which is chaired by Vlasta Molak, SRA secretary. The delegation included Vladimir Piotrovsky, Chairman of the Kharkov Environmental Commission and member of the Kharkov City Council; Vladimir Vladimirovich Rozhkov, head of the newly formed Institute for Ecology of Urban Environments, which was started by the Kharkov Institute of Physics and Technology; Alexander Lvovich Feinstein, senior research assistant at ENERGOSTAL; and Tatiana R. Zaharchenko, professor of environmental law at the Kharkov Law School.

The delegation spent 11 days in Cincinnati, later meeting President Warner North in Washington, D.C., for discussions on forming an SRA chapter in Kharkov.

North is visiting Kharkov (and also Moscow and Kiev) in early June.

## Chapter News

(Note: The 1992 chairman of SRA's Sections and Chapters Committee is Rae Zimmerman, New York University, Robert F. Wagner Graduate School of Public Service, 4 Washington Square North, New York, New York 10003 [Phone 212-998-7432; Fax 212-995-3890]. The responsibilities of the former Chapter Liaison and Relations Committee have been transferred to this committee.)

### Columbia-Cascades Chapter

A half-day meeting of the Columbia-Cascades Chapter was held on Saturday, March 14, at the National Oceanographic & Atmospheric Agency facility at Sand Point on Lake Washington. A mini-workshop to acquaint scientists and engineers with basic principles behind successful communication of risk-related information to non-technical people was presented by SRA member Andrea H. McMakin of Pacific Northwest Laboratory in Richland, Washington. McMakin develops communication activities and products for the Hanford Environmental Dose Reconstruction Project, which is estimating radiation doses that the public may have received from the Hanford Site operations since 1944. The past chapter president, George Cvetkovich of Western Washington University, also gave an update on his research on risk perception and risk communication.

In addition to his phone number (see box), Jim Dukelow, the chapter president, may be contacted by fax (509-376-9200) or email (js\_dukelow@pnl.gov).

### Greater Pittsburgh Chapter

The issue of incinerating hazardous waste has been in the forefront of public debate in the Pittsburgh area for the past two years. The East Liverpool, Ohio, incinerator, which is being built 38 miles from Pittsburgh, and a proposed incinerator in rural Clarion County, which is 90 miles northeast of Pittsburgh, have run into opposition. Given the interest in this topic, the Greater Pittsburgh Chapter held a half-day symposium in January on the social, political, and economic issues which have driven the siting process and determined the outcomes of successful attempts to site hazardous waste incinerators.

The symposium included presentations by two principal speakers: Sharla Barber, Manager of Environmental Planning at APTUS (a Westinghouse company), who has been involved with the successful permitting, siting, and operation of four incineration facilities in Texas, Utah, and Kansas; and Richard Gimello, Vice President of Site Development at Concord Re-

sources Group, who has been involved in hazardous waste siting in Pennsylvania, New Jersey, and now the Clarion County facility.

The chapter's spring meeting on May 21 at the Graduate School of Public Health, University of Pittsburgh, featured a panel discussion by three of the school's faculty members who were the principal investigators of the *Drake Chemical Workers Health Study*. In 1985, Gary Marsh of the Department of Biostatistics, Laura Leviton of the Department of Health Services Administration, and Evelyn Talbott of the Department of Epidemiology began a five-year study (which has been continued for another three years) of former employees of the Drake and Kilsdonk Chemical Plants, located in rural Lock Haven, Pennsylvania, to determine if there was an excess risk of bladder cancer for those exposed to chemicals from the plant. Beta-naphthylamine (BNA), which in other studies has been linked to an increased incidence of bladder cancer, was produced at the plant.

The 1992 chapter officers are: President, Jeanette M. Trauth, Graduate School of Public Health, University of Pittsburgh, A-653, Pittsburgh, Pennsylvania 15261 (Phone [see box]; Fax 412-624-3146); President-Elect, Jon F. Merz, Department of Engineering and Public Policy, Carnegie-Mellon University; Secretary, J. David Pipozar, Allegheny County Health Department; and Treasurer, Harilal L. Patel, Bureau of Air Pollution Control, Allegheny County Health Department. Councilors are Julian B. Andelman, Graduate School of Public Health, University of Pittsburgh; James E. Mudge, SE Technologies, Inc.; and James Miller, Keystone Environmental Resources, Inc.

### Michigan Chapter

The Spring meeting of Michigan Chapter on Friday, April 24, focused on the topic "Risk Issues: Mercury in Michigan." The topic was developed from information obtained in an interest survey of the attendees at the 1991 Fall meeting and the membership.

The meeting began with registration at 8:00 AM, and the program ended at 4:10 PM. Rolf Hartung of the University of

Michigan School of Public Health hosted the event, which was held in the School's auditorium, and later spoke on "Exposure Assessment: Measured vs. Absorbed Dose." Other speakers and their topics were: Frank D'Itri of the Michigan State University Water Resource Institute, "Disposition of Mercury in the Environment"; John Hesse of the Michigan Department of Public Health, "Fish Consumption Health Advisories"; Richard Rothstein of Camp, Dresser & McKee, "Mercury Abatement and Control Technologies"; Joy Taylor of Michigan Department of Natural Resources, "Regulatory Issues"; Nick Kachman of General Motors Corporation Research and Environmental Staff, "Economic Considerations"; and Dave Dempsey of Clean Water Action, "Case Study and Discussion—Municipal Incinerators."

### National Capital Area Chapter

The new officers of the National Capital Area Chapter are: President, Herbert C. Hammond, Department of Health and Human Services, Office of Health Policy, Room 442 E, 200 Independence Avenue, S.W., Washington, D.C. 20201 (Phone 202-245-7272); President-Elect, Nathaniel F. Barr, U.S. Department of Energy; Secretary, Rebecca Klemm, Klemm Analysis Group, Inc.; and Treasurer, Lee R. Abramson, Office of Nuclear Regulatory Research, Nuclear Regulatory Commission. Councilors are James V. Delong, Olsson, Frank & Weeda; Curtis Haymore, SocioTechnical Research Applications; and Mary Burr Paxton, The American Petroleum Institute.

### New England Chapter

Elections for the president-elect, secretary, and treasurer of the New England Chapter were held in May. The new officers will take office in June when the 1991-92 president-elect, Charlie Menzie of Menzie-Cura Associates, becomes president of the chapter. Halina Brown of Clark University chaired the Nominating Committee.

On May 20, the joint meeting of the New England Chapter and the Boston Risk Assessment Group (BRAG) began with

Michael Hutchinson of the Massachusetts Department of Environmental Protection (DEP) speaking on "VOCs in Indoor Air: DEP's Evolving Approach." After a dinner break, Ned Holstein of Environmental Health Associates spoke on "Why Are Standard Approaches to Risk Assessment for Asbestos Misleading?"

The next Chapter/BRAG meeting is scheduled for June 17. In the afternoon, Charlotte Dougherty and Eric Ruder of Industrial Economics will give a talk on "International Applications of EPA's Comparative Risk Assessment Methodology: A Case Study in Ostrava, Czechoslovakia." In the evening, Halina Brown will speak about her research in Poland in which she is examining correlations between indicators of both pollution and health.

The New England Chapter currently has 75 members. Anyone who would like to be placed on the chapter mailing list should call Margaret Round of NESCAUM (Phone 617-367-8540).

### Research Triangle Chapter

An opportunity to display advertisements announcing existing job openings is provided at the monthly meetings of the Research Triangle Chapter. The meetings begin with refreshments at 5:00 PM and continue with a program from 5:30 to 7:00.

At the March meeting, Kevin Morgan of the Chemical Industry Institute of Toxicology and Mary Beth St. Clair of the North Carolina State University Department of Toxicology spoke on "Sense of Smell, Quality of Life and Risk Assessment." In April, Vaclav Jirasec, who is a senior designer of water structures at Povodi Labe, Hrandec Kralove, and a fellow in the Hubert H. Humphrey Fellowship Program at the University of North Carolina Department of City and Regional Planning, spoke on "Environmental Problems in Czechoslovakia," an overview of contributions from industry and other sources to water and air pollution and new governmental initiatives to address the issues.

### Ohio Chapter

The Spring 1992 meeting of the Ohio Chapter (OSRA) was held on April 15 in Dublin, Ohio. Organized by Chapter Councilor Ron Marnicio, Ebasco Environmental, the topic was "Process Safety Management Under 29 CFR 1910.119: A Discussion of Risk Assessment and Management Options." The other speakers and their topics included: Paul Baybutt of Primatech,

Inc., "The Process Hazards Analysis Requirements of 29 CFR 1910.119"; Philip Comer of DNV Technica, Inc., "How Should Companies Respond to the New OSHA Regulations?"; Kenneth Poirier, of U.S. EPA, "Occupational and General Population Health Effects Criteria for Process Hazards Analysis"; and Robert Johnson of Battelle Columbus, "Comparing and Managing Chemical Process Risks." Fifty people from industry, government, utility, and consulting groups attended the half-day event at the Ebasco Environmental facility. Short-term responses to the newly promulgated regulatory requirements, as well as longer range risk management strategies, were presented and discussed.

The next meeting of OSRA will be held on June 5 in Cincinnati and will focus on the topic "Ecogenetics and Approaches to Risk Assessment." This event will be a joint meeting with the Ohio Valley Chapter of the Society of Toxicology. OSRA will host a reception on the evening of June 4th. The fall meeting is tentatively scheduled for a day in October on the topic "Composting of Municipal Solid Wastes: Associated Problems and Possible Health Risks." For further information about these upcoming meetings, contact the chapter president, Bert Hakkinen of Proctor & Gamble (Phone 513-627-1521; Fax 513-627-2292) or chapter president-elect, Michael Dourson of U.S. EPA/ECAO (Phone 513-569-7533; Fax 513-569-7475).

Hakkinen, Steve Lutkenhoff, who works with the U.S. Environmental Protection Agency and is treasurer of the chapter, and Marnicio are developing a review article for *Risk Analysis: An International Journal* which will summarize RISKWARE '91, the exhibition of risk analysis-related software and databases held during the SRA Annual Meeting in Baltimore. The group is also beginning work on RISKWARE '92, to be held dur-

## Chapter Contacts

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**Research Triangle:** Josephine Mauskopf (president), 919-541-6468.  
**Rocky Mountain:** Ralph Grover (president), 303-450-0005.  
**Southern California:** Bob Mulvihill (president), 310-640-1050.

**Note:** The telephone number of Ohio Chapter contact, Bert Hakkinen, was incorrectly printed in the January issue of RISK newsletter. The above number is correct.

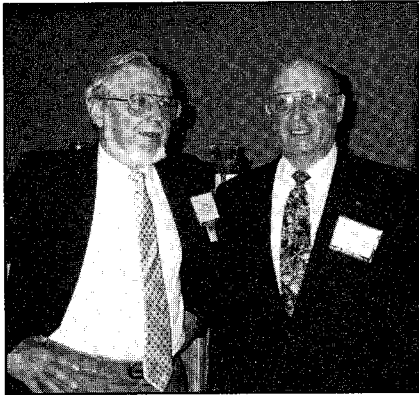
ing the 1992 SRA Annual Meeting in San Diego.

### Southern California Chapter

The Fifth Annual Workshop sponsored by the Southern California Chapter of SRA was held at the University of Southern California (USC) Institute of Safety and Systems Management on March 31. The 60 persons who attended included representatives from Los Angeles County, Los Angeles City, and California State governments; professors and students from USC and the University of California, Los Angeles; and several industries. The theme of the workshop was "Project Safety Enhancement — Applications of Risk Analysis." Nine papers were presented on topics associated with aerospace, methodology, and chemical process, followed by a panel discussion on "Risk Analysis in the Industrial Design Environment—Aerospace, Chemical/Petrochemical, Manufacturing, and Power Plants." Abstracts of the papers were distributed at the workshop.

The chapter hosted a dinner meeting in May with Richard E. Heck, a senior safety engineer with UNOCAL Corporation, speaking on the new U.S. Federal regulations on process safety management and giving examples on the implementation and interpretation of the law.

## Frosch Urges Use of Differential Risk Analysis



Former SRA-President Richard C. Schwing (left) with Robert A. Frosch.

Robert A. Frosch, vice president in charge of General Motors Research Laboratories, was the Wednesday luncheon speaker at the 1991 SRA Annual Meeting. Frosch joined GM after serving as president of the American Asso-

ciation of Engineering Societies in New York and (from 1977 to 1981) as administrator of the National Aeronautics and Space Administration. In earlier positions he served as director of Columbia University's Hudson Laboratories; director for Nuclear Test Detection for the Advanced Research Projects Agency in the Office of the Secretary of Defense, Washington, DC; director of the Advanced Research Projects Agency, Assistant Secretary of the Navy for Research and Development; assistant executive director for the United Nations Environment Programme; and associate director for Applied Oceanography at the Woods Hole Oceanographic Institution in Massachusetts. He received his Ph.D. in theoretical physics from Columbia University in 1952.

The following is an abbreviated version of his address.

I want to discuss some of my feelings about the risk industry, which is growing rapidly largely because we have all decided to be safe. Defining risks is in part an examination of data and effects. But it is also an exercise of the imagination, so that we not only say what *has* happened but also what *may* happen and what might we do about it. The result can be large catalogs of potential risks.

This raises two problems—one being the definition of the problem to be solved. An important difference exists between legal practice and scientific practice in that regard. Lawyers have their tradition that only the question that has been asked may be addressed. Scientists, on the other hand, allow partial answers to a question to modify the question and may even migrate to some entirely different question.

The risk business seems to be hung up between those two approaches. Risk is largely operated in a legal regulatory mode that refuses to examine the question once it has been put. At the same time, we are trying to apply scientific methods to develop the answers to questions. I would suggest that this incongruity between two modes of thought is not helping us very much in addressing the real world problems.

The second problem has to do with the management of risks. Nobody ever encounters a risk. What we encounter is a set of risks. The question is: How does one take a random walk into the future with some reasonable management of the risks?

The problem is complicated by the fundamental theorem of economics, which I define as "The available effort is always finite," or "The available effort is much smaller than the supply of risks." This limitation tells me, as a confessed rationalist, that we must compare risks, and then spend some of our finite effort on those we believe to be most important.

This is, I think, a set of principles that in practice we are heavily engaged in violating as a society. In fact, we have a tendency to take any risk that arises and decide that it must be dealt with. So I would argue that what we need much more of is the application of what I would call differential risk analysis.

This is not a question of the value of life. It is a question of dealing with problems in a rational way. For example, there is a possibility we're preparing to take global warming extremely seriously, and that *may* be the correct action—but only if

that's the right place to spend the money on reducing global risks. I'm a little skeptical because it seems to me that if, in fact, we are driven by global warming, then the underlying problem is not quite so much how we manage energy but the total population and its attempt to have a economic life. That is a risk problem which we have all been very careful to avoid. But given the predictions of what might happen with a total temperature rise, it's difficult to see how those most affected would be able to tell that it had happened, given the other risks and noise that arise in their lives. For example, will those in Ethiopia or the Mideast consider global warming the subject they should worry about most?

On the other hand, I could be quite wrong. So what does one do? At this point, we can't make comparisons very well, because we don't know the probabilities. But we *can* make contingent plans. That is, we can proceed into the future by doing something that seems reasonable, see what happens, and then do the next thing. We can attempt to deal with the uncertainty by hedging, and that's a reasonable strategy for a multiple risk case. In fact, the conclusion of the National Academy of Sciences panel that looked at global warming was that it seems reasonable to take some actions but not to try to immediately solve a problem which may or may not be real.

In conclusion, I want to say that by trying to solve everything, we are building up an ever more complicated set of statutes, rules and regulations. For example, the Clean Air Act, which runs to several hundred pages and is to be interpreted with regulations that will run to several thousand pages, can't possibly be regarded as anything other than bizarre. The difficulty is that we have no idea whether they are self-consistent or not. In fact, we know that many regulations are *not* consistent. The logical result in mathematics for non-self-consistent logical systems is that all theorems are true and all theorems are false as soon as an inconsistency occurs. The consequence for the national life is that everyone is guilty and everyone is innocent if they have anything to do with any of the regulations. I am concerned that we are laying the foundation for a kind of bureaucratic totalitarianism in which the choice of guilt or innocence lies in those who enforce the regulations. When one makes this complaint, however, the response is always "Yes, but the regulation is necessary and it was the best regulation that we could possibly get." I think we can—we must—do better than that.

## Habicht Discusses EPA Risk Assessment Program

Henry Habicht III, Deputy Administrator of EPA and Chair of the Interagency Working Group on Risk Assessment for the Federal Coordinating Committee on Science, Engineering and Technology (FCCSET), was the Tuesday luncheon speaker at the 1991 SRA Annual Meeting. The following remarks have been excerpted from his talk.

I'm here to share with you what we're doing at EPA and also to enlist your help in the major responsibilities we've taken on—both in the federal government and around the environmental protection community—to open up, demystify, and make more useful and scientifically credible the process of risk assessment.

Thomas Jefferson said that the success of a free democracy depends on the exercise of the informed discretion of the electorate; and, further, that the job of government, if the electorate is not informed, is not to make all the decisions for them but to ensure that they become informed. If we look at risk assessment and how it fits into both EPA and a broader social policy, it is clear that risk assessment is basically the scientific raw material which the people and their representatives use to make social policy decisions. It's more important than ever at EPA as we go through periods of emphasis in environmental protection on technology-based approaches vs. risk-based approaches. Armed with the good advice from our Science Advisory Board and their report *Reducing Risk*,\* we know that solid, scientifically based risk assessment is critically important to our ability to set risk-based priorities. Naturally, assumptions and judgments will still be in [our decisions], but the science base is something we at EPA are absolutely committed to.

To give you an idea of how we're thinking about risk assessment and how we can put some of these enormously complex and challenging individual scientific issues into context, I want to mention two articles I have recently read which, I think, help describe where we're headed. The first was a speech given by Ray Smith, the chairman of Bell Atlantic Corporation, in which he said there is a "loaves and fishes" phenomenon in information. That is, the more information is shared in a meaningful way, the more valuable it becomes.

We must share information and build data systems more systematically. In doing so, we need to take advantage of our ability to digitize and integrate data more

effectively and also to communicate it through fiber optics and other advances in communication technology.

The second article was written by Peter M. Senge and published in an MIT journal.\*\* Called "Building Learning Organizations," it advises business CEOs, but the article is applicable to EPA. It had three main points. The first was that a modern organization has to look at systems rather than reacting to events. The second was that we have to concentrate on causes rather than symptoms. (That's what pollution prevention is all about—looking at causes, looking at systems and interrelationships, rather than responding to events.) The third was that a successful learning organization is one which is not oriented toward having the person at the top of an organization call all the shots. While decisions need to be made at the top, it is important that all the pieces of information be shared broadly inside and outside the organization and that they be accessible, so that people can see the interrelationships among those pieces.

These concepts are not new, but I think it's important to know that these are the kinds of ways we're orienting our thinking as we develop our agenda, both in dealing with individual problems at EPA and in looking at the long-term picture of science at the Agency. We are developing strategic plans, developing a strategic sense of priorities, and even looking at sectors of the economy, or types of chemicals, without being limited to particular statutory programs. We're looking at geographic areas and the interrelationship between human activities and human health and ecological risks in those areas and actually trying to make concrete, priority decisions, based on looking systemically at those manageable groupings of issues. We call them clusters, such as our lead cluster which groups together all our experts on lead, inside and outside EPA.

What does that mean for science and risk assessment? As you all know, the scientific issues are getting more and more complicated. There's a need for multiple models. We're learning more and more

about multiple exposure pathways and multiple effects on health. Understanding ecological risk is extremely important. Understanding sub-groups within exposed populations is important. As a result, we're focusing on the process of risk assessment as well as results. But mostly we're focusing on a process that's conclusive, is consistent with the principles I've talked about, is much more open and inclusive than it's ever been in the past, identifies the best data and expertise, and shows publicly that we at the Agency are open to re-assessing our conclusions from new data coming in, as we are doing, for example, in our dioxin re-assessment.

There are three basic components in what we're trying to do to improve risk assessment at the Agency. The first is research, which is critically important and probably has not gotten the attention that it deserves over the years. We haven't had a systematic process for identifying gaps in our information. This is the major issue that the FCCSET group is looking at.

The second component is new and updated guidelines. New toxicity guidelines will be out momentarily in the *Federal Register*, and cancer guidelines, as well as others, are being revised in the course of this year.

The third component is the characterization of risk, which is establishing protocols for how we characterize and present the results of risk assessments in a consistent way across the Agency. Obviously, programs have different categories of data and different statutory mandates, so it may still be the case that the bottom line point estimate of 10(-5) will mean one thing in one program and something different in another program; nonetheless, we're going to explain it so that it's easier for people to compare across programs.

How can the Society for Risk Analysis help us in these issues? You can let us know of research projects that should be undertaken, and help us identify significant data gaps and develop better methods and improve the way we communicate risk. We all care about the environment, and we care about investing in this foundation of science and information. Let us take the high road and work closely together as we set the agenda for the future.

\**Reducing Risk: Setting Priorities and Strategies for Environmental Protection*, The Science Advisory Board, U.S. Environmental Protection Agency, September, 1990.

\*\*P. M. Senge, "The Leaders' New Work—Building Learning Organizations," *Sloan Management Review* 32, No. 1, pp. 7-23, 1990.

# Risk-Related Happenings

## Risk Management — Expanding Horizons

The embedded topical meeting *Risk Management — Expanding Horizons* will be held in conjunction with the American Nuclear Society (ANS) Annual Meeting on June 8-10 in Boston, Massachusetts, at the Marriott-Copley Place Hotel. It is sponsored by the ANS Power Division and several co-sponsors, including SRA.

The "Expanding Horizons" are beyond both insurance and conduct of quantitative or probabilistic risk assessment, areas to which the term *risk management* is now frequently applied. The meeting seeks to address a very broad perspective on the wide range of risks that face nuclear and other industries and some innovative approaches to their management.

The technical program schedule begins on Monday, June 8, with the opening plenary session of the ANS Annual Meeting, the topical meeting opening plenary, and a tutorial on risk management. On Tuesday, the sessions are *Broad Context Risk Management Approaches*, *Risk Communication*, *Risk Management Actions to Enhance Human Reliability*, *Risk-Based and Matrix Approaches to Management*, *Applications of Quantitative Risk Assessment to Nuclear Reactor Safety*, and *Organization Culture*. On Wednesday, the sessions continue with *Risk Management Applications*, *Quantitative Applications to Managing Diverse Risks*, *Incident Investigation and Feedback*, and *Factors Affecting Reliability of Human Actions*. The topical meeting ends with the closing plenary session, conducted by General Cochairman B. John Garrick, the 1989-90 President of SRA.

Details on the technical program, such as authors and paper titles, and registration materials are available from the American Nuclear Society, Meetings Department, 555 N. Kensington Avenue, LaGrange Park, Illinois 60525 (Phone 708-352-6611; Fax 708-352-6464).

## Food Safety: The Interpretation of Risk

The Council for Agricultural Science and Technology (CAST) has published Task Force Report CC1992-1, *Food Safety: The Interpretation of Risk*, by F. J. Francis of the Department of Food Science at the University of Massachusetts at Amherst. Francis describes the report in *NewsCAST*:

Food safety involves essentially four areas: the accumulation of data, the interpretation of risk, the communication of risk, and the management of risk. This report concentrates on the accumulation of data and the interpretation of risk, primarily from chemicals. The accumulation of data depends primarily on animal and epidemiological models. The interpretation of risk depends on who is doing the interpreting, since "scientists" and "consumers" interpret risks in different ways.

The examples of Alar, Great Lakes fish, ethylene dibromide, pesticides, and asbestos are cited to discuss the difficulties with the interpretation of risk. Chapter topics include: the principles of animal testing, mode of exposure, levels of dosage, extrapolation from high to low doses, the receding zero, extrapolation

from animal to human data, the epidemiological approach, alternatives to animal testing, interpretation of data, and conclusions.

To order a copy of the report (\$8.00) or inquire about membership in CAST (members may order one free copy of recent Task Force Reports), write to CAST, 137 Lynn Avenue, Ames, Iowa 50010-7197. The phone number is 515-292-2125.

## NAEP Call for Papers

The Spring 1993 issue of *The Environmental Professional* will be devoted to the task of "Managing Remedial Sites: Market, Trends, and Problems." Published by the National Association of Environmental Professionals (NAEP), the special issue of the journal will be distributed to all members of NAEP and sold, also, as a separate book.

Topics of special interest include:

- The Size of the Weapons Complex Clean-up Market: Managing Federal Facilities
- The Role of OMB, EPA, and Other Agencies in Remediation
- Westinghouse's Strategic Work in Site Remediation
- The Leader Contractors: Technical Capabilities and Managerial Needs
- The Role for Engineering and Consulting Firms
- Lessons from the Private-Sector for Federal Facilities

Interested writers should send a 2-page letter outlining their interests as soon as possible to: Bruce W. Piasecki, Associate Professor of Environmental Management, School of Management, Rensselaer Polytechnic Institute, Troy, New York 12180-3590. Phone inquiries should be made to Diane Cassidy (518-276-8499) or Maribeth Metzler (518-276-8120 or -8983). A final copy of submission selected for publication will be due October 15.

## SRA-Sponsored Risk Assessment Course Held

On April 13-14, 1992, the Society for Risk Analysis held its seventh annual course on risk assessment at the Hyatt Regency, Crystal City, Arlington, Virginia. Curtis C. Travis of the Center for Risk Management, Oak Ridge National Laboratory, was course director. The title, "New Directions in Risk Assessment," reflected the theme of the course as internationally known experts presented their views of the methodologies, assumptions, and new research in the risk assessment/risk management field.

Special emphasis was given to new developments in pharmacokinetics, reproductive and immunological risks, interspecies extrapolation, risk management, and risk communication. Lecturers included Roy Albert, Institute of Environmental Health, University of Cincinnati Medical Center; Elizabeth Anderson, Clement International Corporation; Mildred Christian, Argus Research Laboratories; Loren Koller, College of Veterinary Medicine, Oregon State University; Lester Lave, Carnegie-Mellon University; David McCallum, Center for Risk Communication, Columbia University; Richard Reitz, Mammalian and Environmental Toxicology, DOW Chemical Company; Robert Tardiff, EA Engineering Science and

Technology, Inc., Health Sciences Division; Chris Whipple, Clement International; and Travis.

Approximately 55 participants took the opportunity to interact with and ask questions of major leaders in the field of risk assessment.

SRA's eighth annual course on risk assessment has been scheduled for March 29-30, 1993, at the same location as the 1992 course.

### Free Workshop Available on IRIS & TOXNET

The National Library of Medicine (NLM) scheduled a free, one-day workshop for June 5 on the TOXNET system and its databases, including IRIS. If enough requests are received, NLM may offer the workshop again.

The workshop, which is limited to 24 students, is intended for beginning searchers new to TOXNET who need a basic grasp of the content of its files, how they are structured, and how they are searched. An emphasis is placed upon IRIS, using it as a model to demonstrate features of TOXNET searching. Other NLM files, such as the Hazardous Substances Data Bank (HSDB) and TOXLINE, also contain information that could support risk assessment activities and are reviewed in the workshop. A lecture, online demonstration, and hands-on exercises provide workshop participants with a working knowledge of how to search IRIS and other NLM files.

To indicate an interest in attending the workshop at a future date, send your name, complete mailing address and phone number, and NLM USER ID code (if you are a subscriber) to: IRIS/TOXNET WORKSHOP, Toxicology Information Program, National Library of Medicine, 8600 Rockville Pike, Bethesda, Maryland 20814 (Phone 301-496-6531; Fax 301-480-3537).

### Travis Directs NATO Workshop in Portugal

Curtis Travis, past president of SRA, is directing the NATO Advanced Research Workshop: Use of Biomarkers in Assessing Health and Environmental Impacts of Chemical Pollutants at the Grande Hotel Das Termas De Luso, Luso, Portugal, on June 1-5. The workshop brings together international experts on biomarkers and biomonitoring to formulate a unified strategy for development and validation of biomarkers as a means of assessing the status of human and environmental health. The topics of discussion include biomarkers of exposure, biomarkers of dose-response, molecular dosimetry, biomarkers of reproductive toxicity, biomarkers of neurological toxicity, ecological biomarkers, and directions for further research—implication of results. For more information concerning the workshop, contact Dr. Curtis C. Travis, P.O. Box 2008, MS-6109, 4500S, Oak Ridge National Laboratory, Oak Ridge, Tennessee 37831-6109 (Phone 615-576-2107; FAX 615-574-9887).

### Chemical Manufacturers Association Sponsoring Exposure Assessment Activities

The Chemical Manufacturers Association (CMA), whose 180 member companies represent over 90% of the productive capacity for basic industrial chemicals in the U.S., has established an Exposure Assessment Task Group (EATG), whose

mission is to promote the development and proper use of human exposure assessment to help ensure high-quality exposure and risk assessments, and to promote sound regulatory decisions. The EATG members cover a range of technical disciplines (toxicology, industrial hygiene, chemical and environmental engineering) needed to support the mission, and include Sheldon Lande from 3M Company, Bernard Silverstein from ARCO Chemical, Jerry Lynch from Exxon Chemical, Joseph Yang from Mobil Oil, Jerry Schroy from Monsanto, Michael Jayjock from Rohm and Haas, Tom Nelson from Du Pont, and P. J. (Bert) Hakkinen (current chairman) from Procter & Gamble.

The EATG meets with regulatory agency officials, academicians, and others with responsibility and/or expertise in exposure assessment, and has provided scientific expertise and advice on risk and exposure assessment issues and guidelines. A recent EATG sponsored study critically reviewed the major exposure values and assumptions used by EPA and other regulatory agencies to characterize consumer and worker exposure. Other EATG efforts have included studies to develop ways to improve exposure assessment for prospective epidemiology and to evaluate air toxics through a specific case study.

In addition to the EATG, CMA's risk assessment/management-related task groups include ones covering risk assessment, ecological assessment, and epidemiology. Anyone desiring more information about the EATG or other CMA activities is invited to contact Carolyn Leep at CMA, 2501 M Street, NW, Washington, DC 20037 (Phone 202-887-1323).

### ECO WORLD® '92

The first major international conference and exposition on environmental pollution control and remediation technology, called ECO WORLD®, will be held June 14-17, 1992, at the Washington Convention Center, Washington, D.C. The American Society of Mechanical Engineers (ASME) is an organizing sponsor of the event.

According to David L. Belden, executive director of ASME, the four-day conference and exposition will serve as a focal point for suppliers and end-users of environmental pollution control and remediation technologies and emphasize a worldwide systems approach to global pollution issues by focusing on the latest and most advanced technologies. ECO WORLD® also will be a forum for dialogue on a variety of environmental problems and solutions. Papers on environmental pollution control and remediation technology and science, as well as other environmentally related topics, will be presented at technical sessions and seminars hosted by engineers and scientists from around the world.

On Monday, June 15, two afternoon sessions will deal with risk topics. One session, "Risk Assessment Role in Site Remediation," will address the latest scientific and policy developments concerning the role of risk assessment in making risk management decisions at hazardous waste sites and give an overview of the latest U.S. Environmental Protection Agency scientific and policy guidance concerning the role of the risk assessment process. The second session, "Comparing Environmental Risks: The State of the Art," will present a comparison of risks in the production of electrical energy; a comparison of chemical risks; the costs of reducing risks; and a comparison of catastrophes (such as Bhopal, Chernobyl, and Kuwait).

For more information, call 1-800-843-2763.

## Positions Available

### Risk Analysis — Manager Position

The Raleigh, North Carolina office of Applied Research Associates, Inc., is seeking a senior level engineer or scientist to lead our risk analysis technology program. Depending upon the applicant's capabilities and experience, the candidate could also be considered for the Division Manager Position. Technical specialization in one or more of the following areas is desirable: PRA; technology risk analysis; or AI/expert systems/data fusion technology. An established marketing track record and at least five years of principal investigator experience is required.

Division work includes both government and industry funded projects in risk analysis, engineering, and applied science. Applied Research Associates is a small business employing approximately 150 people, with corporate headquarters in Albuquerque, New Mexico. ARA has a significant manager compensation package, including exceptional benefits, bonus, and stock option programs. United States citizenship is required for this position. Send or Fax (919-878-3672) resumes to:



Applied Research Associates, Inc.  
ATTN: Dr. L. A. Twisdale  
6404 Falls of Neuse Road, Suite 200  
Raleigh, NC 27615

### Risk Assessment Analysts

The Bethesda, Maryland and Atlanta, Georgia offices of DAMES & MOORE, an environmental consulting and engineering firm, are seeking experienced Risk Assessors for CERCLA and RCRA sites.

These opportunities offer involvement in a variety of projects which include RI/FS and RFI work for government and private clients, data management and interpretations, and scoping of field sampling programs to fulfill regulatory and technical requirements.

The ideal candidates will possess a strong background in sciences such as hydrogeology, chemistry, toxicology, or related areas and prior experience with risk assessment in accordance with RAGS.

Excellent written and oral communications skills, and pc-level data management abilities are also a must.

DAMES & MOORE offers professional challenges and growth, an excellent work environment and flexible benefits program (including 401K). Please send your resume to:

Sandra Smith, Dept. SRA  
DAMES & MOORE  
7101 Wisconsin Avenue, Suite 700  
Bethesda, Maryland 20814  
*Equal Opportunity Employer*

### Risk Assessment Consultants

The Knoxville, Tennessee, office of IT CORPORATION, an environmental consulting and engineering firm with international operations, has two openings for experienced risk assessment consultants.

These positions are senior positions offering technical and management roles on a wide variety of risk assessment projects

throughout the United States and Europe. One position is for a PhD-level toxicologist who is either board-certified or eligible for certification. Prior risk assessment experience in either government, industry, or consulting is required. The second position requires an academic background in ecology, environmental toxicology, or related fields. A terminal degree is desired. Prior experience in the conduct of ecological risk assessments for CERCLA and RCRA sites is required.

Excellent oral and written communication skills, as well as data management abilities, are necessary. The successful candidates will be able to function productively in a group of 14 other risk assessment professionals as part of a multidisciplinary team approach.

Located in the foothills of the Great Smoky Mountains, the Knoxville office of IT CORPORATION offers excellent opportunities for growth and advancement, competitive compensation packages, and flexible benefits. The area offers access to universities and the Oak Ridge National Laboratory. Qualified candidates should send a *curriculum vitae* to:

Philip M. Sieg  
Manager, Risk Management Services  
IT Corporation  
312 Directors Drive  
Knoxville, TN 37923  
*An Equal Opportunity Employer*

### Toxicologist

Senior Environmental Employment Program seeks experienced Toxicologist to evaluate human risks of hazardous waste sites and chemical contaminants. Requires demonstrated knowledge of organic and inorganic chemistry, physiology and human health effects of toxic substances in environmental settings, as well as familiarity with research and assessment techniques. Familiarity with superfund risk assessment guidance a plus. 40 hrs/wk, \$10.50/hr to start. **MUST BE AT LEAST 55 YEARS OF AGE.** Send resume to:

Ms. Isela Castillo, 3PM40  
U.S. EPA, Region III  
841 Chestnut Building  
Philadelphia, PA 19107

### Commonwealth of Pennsylvania Environmental Economist Salary Range \$39,511—\$61,066

The Pennsylvania Department of Environmental Resources has an opening for an economist specializing in either ecological or engineering economics or both. The position will focus on economic aspects of protecting public health and the environment and may, depending on the applicant's qualifications, include natural resource valuation/cost recovery, cost-risk-benefit issues in the choice of remedial alternatives and evaluation of engineering effectiveness, impacts of permitting on high value natural resources, and costs of policy implementation versus health and other costs of not implementing. It will involve development and review activities, expert witnessing and staff training. Strong writing and communication skills and a doctorate in one or more of the above disciplines is required. This position



is located in Harrisburg, Pennsylvania. Send resumes with copy of this ad to the Pennsylvania Department of Environmental Resources, Bureau of Personnel (EE), Room 717, Executive House, P.O. Box 2357, Harrisburg, PA 17120. For further information, call Linda Walde at 717-783-2021.

*An Equal Opportunity/Affirmative Action Employer*

## Announcement of a Request for Proposal

### Estimation of Population in the Near Vicinity of 345 kV, 500 kV, and 765 kV Transmission Lines in New York State

The Empire State Electric Energy Research Corporation (ESEERCO), on behalf of the major New York State utilities, will be undertaking an effort to estimate the population in the near vicinity of extra high voltage transmission lines in New York State. In July of this year, the utilities will be issuing a request for proposal to develop and test a methodology to estimate the population living near the state's 345 kV, 500 kV, and 765 kV transmission lines and the incremental contribution to the total magnetic field exposure from these transmission facilities to the target population.

All parties interested in receiving the request for proposal should send a letter and appropriate information explaining qualifications by June 30, 1992 to Mr. Ralph W. Wager, ESEERCO, 1155 Avenue of the Americas, New York, New York 10036 or via fax (212) 827-0469.

ESEERCO is a nonprofit corporation funded by major electric utilities in New York State and established to conduct electric research and development beneficial to its members' customers.

## U.S. Legislation Update

### Risk Assessment and Management Commission

*There is hereby established a Risk Assessment and Management Commission, which shall commence proceedings not later than 18 months after the date of enactment of the Clean Air Act (CAA) Amendments of 1990....[Laws of 101st Congress—2nd Session, P.L. 101-549, Sec. 301]*

President Bush signed the CAA Amendments of 1990 into law on November 15, 1990, making May 15, 1992, the 18-month deadline for the work of the Commission to begin. Since October 1991 the RISK newsletter staff has repeatedly but unsuccessfully attempted to obtain the names of the 10 members of the Commission. Apparently the appointments have not yet been made. When this information becomes available, a report will be published in the newsletter.

### Environmental Risk Reduction Act

*S.2132: A bill to require the Administrator of the Environmental Protection Agency to seek ongoing advice from independent experts in ranking relative environmental risks; to conduct the research and monitoring necessary to insure a sound scientific basis for decisionmaking; and to use*

*such information in managing available resources to protect society from the greatest risks to human health, welfare, and ecological resources. [102nd Congress—1st Session, November 27 (legislative day, November 23), 1991]*

Senator Patrick Moynihan introduced the bill S.2132, cited as the "Environmental Risk Reduction Act," in the U.S. Senate, where it was read twice and referred to the Committee on Environment and Public Works. *The bill is still in committee.*

The basis for introducing this bill is defined under "Section 2. Findings and Policy." Congress found that: (1) the U.S. is currently spending \$115 billion per year to protect the quality of the environment, (2) the cost is expected to increase in future years as environmental problems and population increase, (3) it is essential to use such a high cost effectively and efficiently, (4) funds can only be used effectively when they protect the largest number of people from the most egregious harm, (5) risks to ecological resources also affect human health and the economy, (6) ranking relative risks to human health, welfare, and ecological resources is a complex task which is best performed by technical experts free from interests that could bias their objective judgment, (7) applying technology and resources to the highest ranked risks, whether or not they have already been addressed by current statutes, can significantly reduce risks to human health, welfare, and ecological resources, (8) better risk methodologies and long-term collection of monitoring data on the condition of ecological resources and exposure of humans and ecosystems to pollutants are essential to identifying risks and determining the effectiveness of environmental statutes, (9) ranking risks is an ongoing process that must reflect new data and scientific understanding, and (10) effective and efficient strategies to reduce risks must quantify significant costs and benefits to the greatest extent possible. In addition to the findings, U.S. policy charges the Environmental Protection Agency (EPA) to "attain the greatest risk reduction possible with the resources available" while administering federal environmental activities. U.S. policy also recognizes that reducing risks requires: (1) "accurate, quantitative estimates of the exposure of humans and ecosystems to all important risk factors"; (2) "accurate techniques for predicting the effects of such exposures"; (3) "an adequate understanding of technical, economic, social, and legal alternatives to reduce exposure to risk factors"; and (4) "accurate estimates of the costs and benefits of alternatives for reducing risks."

Meeting the challenges of the Congressional findings and U.S. policy statements, the bill provides for the establishment of two standing committees within the Science Advisory Board: Committee on Relative Risks and Committee on Environmental Benefits. The committees would advise the EPA Administrator on the most scientific resources available to reduce risks to human health and ecological resources through the assessment and ranking of relative risks and options for their management. Each committee would consist of 15 experts who would serve six-year terms each and report their findings to the EPA Administrator and appropriate Congressional committees every two years.

The bill also charges the EPA Administrator to develop risk assessment guidelines "to ensure consistency and technical

*(Continued on page 18.)*

## Legislation Update

(Continued from page 17.)

quality in risk assessments by specifying minimum standards for different risk assessment approaches, depending on the scale of the problem, the level of scientific understanding, and the available data," and to conduct a long-term research program in environmental risk assessment. Proposed funding for the research program is \$310 million over six years, with at least one-half of the research designated for contracts or assistance agreements with universities and other nonprofit or not-for-profit organizations.

Finally, the bill would establish an Interagency Panel on Risk Assessment and Reduction to coordinate Federal research, data gathering, and implementation of environmental risk assessment and risk reduction activities. The panel would consist of one representative each from EPA (who would also serve as the panel's chairman); the Departments of Interior,

Health and Human Services, Energy, Commerce, and Agriculture; the Corps of Engineers, the Council on Environmental Quality; and any other Federal department or agency that the President or Interagency Panel Chair considers appropriate.

Within two years after the enactment of this bill, the EPA Administrator will prepare and submit a report to Congress which would identify a prioritized list of risks, the public awareness of each risk, alternative options for reducing risks with estimates of costs and time required, any uncertainty associated with the assessment process, and any research or data collection that could reduce the uncertainty in any assessment within two years of the submission of the report. Congress would then direct the activities of the EPA based on the information from the report, which would be updated at least every two years to reflect new data or scientific understanding.

## Risk Courses Offered

June 22-24. STRATEGIC PLANNING FOR TECHNOLOGY-BASED BUSINESSES, Massachusetts Institute of Technology (MIT) Program in Technology, Management and Policy, Cambridge, Massachusetts. A short course on practical, state-of-the-art methods to deal with the financial and technological risks associated with decisions concerning investments, the commercialization of new technology, new products, and pricing. The faculty includes MIT professors Joel Clark, Richard de Neufville, and Frank Field. Tuition is \$1500 (group discounts available). For more information, contact Conference Services Office, MIT, Room 7-111, Cambridge, Massachusetts 02139 (Phone 617-253-1703; Fax 617-253-7002).

June 22-26. PRINCIPLES OF BIOSAFETY FOR CLINICAL, INDUSTRIAL, AND ACADEMIC FACILITIES, Harvard School of Public Health, Boston, Massachusetts. Tuition: \$1200. For information, contact Mary F. McPeak, Office of Continuing Education, Harvard School of Public Health, 677 Huntington Avenue, Boston, Massachusetts 02115 (Phone 617-432-3515; FAX 617-432-1969).

July 20-24 (Basic Course), 27-29 (Practicum). QUANTITATIVE RISK ASSESSMENT FOR ENVIRONMENTAL AND OCCUPATIONAL HEALTH HAZARDS, Massachusetts Institute of Technology Program in Technology, Management and Policy, Boston, Massachusetts. Short course to provide the basic background for technically oriented people to participate as members of interdisciplinary teams in the quantitative assessment of health risks. The faculty includes SRA member Dale Hattis, Center for Technology, Environment and Development, Clark University, and Harold F. Hemond, Parsons Laboratory of MIT Department of Civil Engineering. Basic course tuition is \$1300; practicum, \$1000 (group discounts available). For more information, contact the address which is listed for the June 22-24 course.

July 22-August 26. PROFESSIONAL CERTIFICATE PROGRAM IN HAZARDOUS MATERIALS MANAGEMENT, University of California Extension, 3120 De la Cruz Boulevard, Santa Clara, California. A summer intensive program in which the HMM Certificate can be completed in six to eight weeks. Tuition is \$2100. For more information about the Summer

Intensive Program or related courses, write or call the University of California Extension, 740 Front Street, Suite 155, Santa Cruz, California 95060 (Phone 408-748-7380).

August 3-7. EMERGENCY PLANNING FOR CHEMICAL ACCIDENTS, Harvard School of Public Health, Boston, Massachusetts. Tuition \$1025. For more information, contact Mary F. McPeak (see June 22 above).

August 3-7, 17-21, and 24-28. SAFETY ANALYSIS & RISK ASSESSMENT FOR CHEMICAL PROCESS INDUSTRY PRACTITIONERS, Omni Northstar Hotel, Minneapolis, Minnesota. Three courses designed to teach engineers and scientists how to perform safety analyses and risk assessments of CPI plants: Hazards Evaluation—Qualitative Methods, Hazards Evaluation—Quantitative Methods, and Consequence Assessment & Mitigation. Organized by the American Institute of Chemical Engineers (AIChE) in association with its Center for Chemical Process Safety. For more information, contact AIChE, 345 East 47th Street, New York, New York 10017.

August 17-21. OCCUPATIONAL & ENVIRONMENTAL RADIATION PROTECTION, Harvard School of Public Health, Boston, Massachusetts. Fee: \$1075. For more information, contact Mary F. McPeak (see June 22 above).

September 9-11. RISK ANALYSIS IN OCCUPATIONAL & ENVIRONMENTAL HEALTH, Harvard School of Public Health, Boston, Massachusetts. Fee \$750. For more information, contact Mary F. McPeak (see June 22 above).

September 21. ASBESTOS REFRESHER COURSE FOR INSPECTORS, MONITORS, AND MANAGEMENT PLANNERS, Harvard Educational Resource Center, Boston, Massachusetts. Tuition is \$225. [See June 8 above.]

September 22. ASBESTOS REFRESHER COURSE FOR PROJECT DESIGNERS, Harvard Educational Resource Center, Boston, Massachusetts. Tuition is \$225. [See June 8 above.]

October 26-30, November 9-13 and 16-20. SAFETY ANALYSIS & RISK ASSESSMENT FOR CHEMICAL PROCESS INDUSTRY PRACTITIONERS, Doral Ocean Beach Resort, Miami Beach, Florida. [See August 3-7 listing above.]

## New NCRP Effort on Extrapolation of Radiation Exposure Risks

While it is recognized that the best sources of information on the risks of radiation exposure are the humans exposed as a result of the atomic bombings or for medical purposes, the levels and rates of exposure involved and other confounding factors impose serious limitations on the applicability of this information to the estimation of risks important to everyday radiation protection practice. On the other hand, a very considerable body of information has been obtained from laboratory studies on the effects of radiation on non-human biological systems. As a result, the National Council on Radiation Protection and Measurements (NCRP) has determined to initiate a new activity concerned with extrapolation of risk from non-human experimental systems to man. The new work seeks to develop means of extrapolating the results

of laboratory studies to humans. It will include examination of radiobiological data from different experimental systems to establish fundamental similarities and the underlying reasons for the similarities and differences. The examination will include cytogenetics, cell killing, mutagenesis, neoplastic transformation and carcinogenesis, with the aim of establishing principles for methods of extrapolation. An effort will be made to evaluate proposed methods of extrapolating risks across species and to formulate recommendations on their potential use and on the development of more appropriate methods. NCRP Scientific Committee 1-4 has been constituted to undertake the new work.

—Courtesy W. Roger Ney  
Executive Director, NCRP

## Calendar of Events

June 13-27. EIGHTH EURO SUMMER INSTITUTE (ESI VIII), The Rescue Services College, Rosersberg Castle, Stockholm, Sweden. Organized by the Swedish Operations Research Association for the Association of European Operational Research Societies (EURO). The theme of the meeting is "Risk Management in Complex Production and Transportation Systems." 20 young scientists will present research papers on a topic within the theme, in addition to lectures by invited experts. A special issue of the *European Journal of Operational Research* will be prepared based on papers presented at the Institute. More information may be obtained from a national Operational Research Society or: ESI VIII, P. Wulff, FOA, S-172 90 SUNDBYBERG, SWEDEN (Phone 46-8-663-15-00; Fax 46-8-667-32-04).

June 29. SRA-JAPAN'S ANNUAL SPRING MEETING AND WORKSHOP, Sanzyo-Hall, The University of Tokyo, Tokyo, Japan. The topic is "Practices and Approaches in Chemical Risk Assessment." For more information, contact: Prof. Saburo Ikeda, Secretary, The SRA-Japan Section, c/o Inst. Socio-Economic Planning, University of Tsukuba, Tsukuba, Ibaraki 305, Japan [Phone (0298) 53-5380; Fax (0298) 55-3849].

August 18-20. SYMPOSIUM ON GREENHOUSE GAS EMISSIONS AND MITIGATION RESEARCH, Washington, DC. The Air and Energy Engineering Research Laboratory of the U.S. Environmental Protection Agency and Acurex Environmental will be cosponsoring an international symposium to discuss global change emissions and potential mitigation technologies and practices. The symposium will provide a forum to exchange up-to-date information on emission sources contributing to global warming, state-of-the-art mitigation technologies and practices, and the status of activities to refine emission estimates and develop new technologies. For more information, contact Richard D. Stern (Phone 919-541-2973; Fax 919-541-2382).

August 19-22. INTERNATIONAL ASSOCIATION FOR IMPACT ASSESSMENT (IAIA) '92 ANNUAL MEETING, World Bank Headquarters, Washington, D.C. Will compare the methods of environmental assessment in industrial and third world countries as it relates to sustainable development. To obtain a

preliminary program and registration information, contact IAIA Executive Office, P.O. Box 70, Belhaven, North Carolina 27810 (Phone 919-964-2338; Fax 919-964-2340).

September 14-18. XIITH INTERNATIONAL CONFERENCE ON THE SOCIAL SCIENCES AND MEDICINE, Peebles Hotel Hydro, Peebles, Scotland, United Kingdom. One of the main themes of the conference will be the concept of risk and risk-taking in health care and health behavior. For further details and application forms, write to the chair of the planning committee: Dr. P.J.M. McEwan, Glengarden, Ballater, Aberdeenshire AB3 5UB Scotland (Phone 03397 55429; FAX 03397 55995).

October 2-4. SIXTH MEETING OF THE SOCIETY FOR HUMAN ECOLOGY (SHE), Snowbird, Utah. The theme of the meeting is "Human Ecology: Crossing Boundaries," emphasizing the role of human ecology in spanning boundaries between traditional disciplines, theory and practice, individuals and society, and social, biological and physical environments. A significant portion of the program will be devoted to environmental social science. The deadline to submit proposals of papers, sessions, workshops, round table discussions, or other forms of meeting participation was April 1, 1992, but submissions received after that date will be considered. Please send submissions to: Scott D. Wright, FCS Department, University of Utah, 228 AEB, Salt Lake City, Utah 84112 (Phone 801-581-8750; Fax 801-581-3007, marked "ATTN Scott Wright").

December 6-9. SRA ANNUAL MEETING, Hotel Del Coronado, San Diego, California.

April 25-28, 1993. THE SECOND INTERNATIONAL SYMPOSIUM ON UNCERTAINTY MODELING AND ANALYSIS, University of Maryland, College Park, Maryland. The objective of this symposium is to bring together researchers from academic, governmental, and industrial institutions to discuss new developments and results in the field of uncertainty modeling and analysis including probabilistic methods, Bayesian approaches, fuzzy reasoning, and risk management. For more information, contact Professor Bilal M. Ayyub, Department of Civil Engineering, University of Maryland, College Park, MD 20742 (Phone 301-405-1956; Fax 301-314-9320).



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## Re: The Earth Summit

Last September, when nobody seemed to be talking about it, RISK newsletter ran a full-page story on the Earth Summit to be held in Rio de Janeiro, Brazil, June 1-12. We also reported that the Global Forum accompanying the Summit would include an SRA-sponsored workshop on "The Role of Risk Analysis in Evaluating and Solving Environmental Problems"; however, those plans have since been cancelled.

As you receive this newsletter, the Earth Summit is under way and we are saying very little about it. The reason should be obvious: You are being flooded with information from other sources, and we don't think we can add anything to the discussion at this point.

We should point out, however, that a number of SRA members are interested—even deeply concerned—about the outcome of the conference. Some are convinced that global warming will trigger numerous real disasters in coming decades and that all nations should cooperate to prevent that from happening. Others are worried that hasty and expensive actions might be taken on what they consider to be an as-yet unproven theory. Undoubtedly, SRA members also have contrasting views on other topics to be addressed by the Summit.

We must wait a few weeks to know the outcome of this particular conference, but one thing is already clear. The media coverage and controversy preceding the Summit has highlighted the monumental environmental problems facing the earth and shown that international cooperation is mandatory to finding their solutions. With or without a consensus in Rio, the Summit will be a large step in the forward direction.—*Lorraine S. Abbott*

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