September 3, 1999
(signatories updated December 20, 1999)

Richard R. Monson M.D., Chair
c/o Rick Jostes, Staff Officer
Committee on the Health Risks from Exposure to Low Levels of Ionizing Radiation (BEIR VII)
National Academy of Sciences
2101 Constitution Avenue, NW
Washington, D.C. 20418

Dear Dr. Monson,

We are writing in connection with your committee's work on assessing the effects of low-level radiation in the form of the Biological Effects of Ionizing Radiation (BEIR) VII review.

We are pleased that the BEIR VII Committee has set out to "consider a large amount of published data ... concerning the risks to humans of exposure to low levels of ionizing radiation" (BEIR VII Project Scope). We expect that, as part of this work, the Committee will examine conflicting evidence and interpretations in the process of identifying biological effects and risk factors. We look forward to following closely the Committee's deliberations throughout this important process and to participating in them.

The work of past BEIR Committees has been influential in setting the tone and terms of the scientific debate on the issue and in the radiation standard-setting process. Therefore, we believe it is crucial that the full range of information and issues regarding the health effects of ionizing radiation be considered. The BEIR V report considered only risks of cancer, some aspects of genetic damage (though it did not estimate risks of "diseases of complex genetic origin, which are thought to comprise the largest category of genetically-related diseases," p. 4) and mental retardation arising from in-utero exposure.

It is important that the BEIR VII process address the full range of risks that have not been conclusively evaluated so far. This should include risks that have come to light since the BEIR V report (such as the combined effects of radiation and hormonally-active agents, also called endocrine disrupters) as well as issues that could have been addressed in BEIR V, but were not. We have compiled a list of some of the most crucial issues that we believe you should address. These issues are as follows:

- **Effects of radionuclides that cross the placenta**: This should include consideration of the effects on the developing fetus itself (e.g. miscarriages, malformations, and developmental effects other than mental retardation) and the effects on relevant organs at
critical periods of fetal development. This study of health effects on the developing fetus should specifically include effects on development of specific organs, and the indirect effects of harm to organs such as the thyroid. We are especially concerned about radionuclides such as iodine-131, carbon-14, and tritium that could become part of the fetus in ways that could profoundly affect its well being. For instance, tritium, being a form of hydrogen, combines with oxygen to form water. Tritiated water behaves chemically like ordinary water. If ingested, a fraction of it becomes incorporated into the cells of the body, including genetic material. Such radioactive water also crosses the placenta. The potential for the resultant in-utero exposure to cause miscarriages, birth defects, and other health problems needs to be examined. The BEIR VII committee's evaluation of the risks of low-level radiation should include all such radionuclides and effects. If there are gaps in present knowledge, these should be identified clearly and their implications should be spelled out.

- **Effects of radiation on female fetuses:** Considering that ova are formed once per lifetime during females’ fetal development, the Committee should evaluate the effects of radiation on the reproductive system of female fetuses and the possible effect of such radiation on the children of females irradiated in this way.

- **Effects of organically-bound radionuclides:** Radionuclides such as tritium or carbon-14 can become part of the DNA. Upon radioactive decay, they transmute into other elements. (Tritium becomes helium-3 and carbon-14 becomes nitrogen-14.) Such transmutation events could adversely affect the DNA. The potential health effects of such transmutations need to be evaluated.

- **Synergistic effects:** Exposure to radiation is sometimes coupled with exposure to other hazardous substances. The Committee should consider health effects caused by combined exposure to radioactive and non-radioactive substances. Special attention should be given to substances such as hormonally active agents that affect the hormonal system and the possibility that such disruption might increase the risk of cancer and other diseases arising from radiation exposure. Conversely, radiation exposure might damage the endocrine system, thereby increasing vulnerability to other disease-producing agents in the environment. The possibility of variability of such risks depending on age of exposure (and whether exposure takes place in-utero) should also be considered.

- **Data integrity and quality:** Worker dose records of the U.S. Department of Energy, and its predecessor agencies, are deeply flawed. The environmental contamination records are similarly deeply flawed. We know these things about the United States because much of the raw data record has become public through lawsuits, Freedom of Information Act requests, etc. Use of studies that accept official US worker or offsite dose estimates without evaluation of the raw data is highly questionable to say the least. Since the raw data in other countries are still largely secret, there is even less reason to accept them at face value. For instance, there is evidence that the health data in the former Soviet Union are questionable. The Committee should review these and related fundamental questions of data integrity and address whether any of this record is suitable at all for assessing the risks of low-level radiation, and if so how it should be used. The Committee should also address what criteria of data quality it will apply to the information contained in the studies it reviews. In this context, we do not believe that it will be enough to simply accept peer-reviewed studies as correct if they have not evaluated the soundness of the underlying official dose and health data. Finally the impact of misclassification of
radiation exposures and health outcomes and health-related selection factors, should be considered in interpreting all epidemiological studies, including studies of A-bomb survivors.

- **Effects on various populations:** The concept of "standard man" or "average" is often used to set radiation protection standards. Given the potential large variability of actual health effects of radiation in various populations, the Committee should assess the errors in risk estimates produced by the use of this concept. For instance, the age-dependence of the dose response relationship for various health effects should be explicitly spelled out, not only for children, but also for older age groups. Another example is the potential variation in sensitivity to low-level radiation among individuals who are otherwise of similar demographic make-up. In many of these areas, it may be that there is simply not enough knowledge to come to reliable scientific conclusions. In such cases, the Committee should clearly and frankly say so and recommend a research agenda. If possible, this should be accompanied by qualitative discussions of the mechanisms of potential health effects. It is of crucial importance to us that all areas where risk cannot be reliably calculated are clearly identified. If the types of risk can be qualitatively ascertained, the risks should be spelled out. If even the qualitative risks cannot be assessed, that conclusion would also be very material.

We have not discussed cancer-related issues above because we are presuming that the Committee will address the full range of relevant literature in regard to carcinogenic effects. It would be helpful if the committee published and updated frequently a list of the publications that it is reviewing, so that we may be able to follow the review and add to that list, should we feel that to be necessary or desirable.

We look forward to providing scientific input throughout the BEIR VII process and expect that the Committee will fully address the issues we have raised as seriously as it might were those same issues raised by a member of the Committee.

We appreciate the opportunity for public comment and ask that it be expanded as needed to fully accommodate the issues and evidence that we want to put forth. We look forward to your response. Do let us know if you have any questions or need more information. Please address your questions or responses to Lisa Ledwidge or Arjun Makhijani. Thank you very much.

Sincerely,

Lisa Ledwidge          Arjun Makhijani, Ph.D.
Outreach Coordinator    President
ieer@ieer.org           arjun@ieer.org

**Other signatories:**

David E. Adelman, Natural Resources Defense Council, Washington, D.C., USA
Glenn Alcalay, Co-chair, National Committee for Radiation Victims, New York, New York, USA

Jennifer Aldrich, Executive Director, Physicians for Social Responsibility/Oregon, Portland, Oregon, USA

Dave Andrews, Vice Chair, Campaign for Nuclear Disarmament, Wales, UK

Didier Anger, le CRILAN, Les Pieux, France

Paulette Anger, le CRILAN, Les Pieux, France

Caron Balkany, Concerned Citizens for Nuclear Safety*, Santa Fe, New Mexico, USA

Dan Becker, Director, Global Warming and Energy Programs, Sierra Club, Washington, D.C., USA

Rosalie Bertell, Ph.D., GNSH, President, International Institute of Concern for Public Health, Toronto, Ontario, Canada

Patricia T. Birnie, Chair, GE Stockholders' Alliance, and Chair, Environment Committee, Women's International League for Peace and Freedom, Tucson, Arizona, USA

Philippe Brousse, Secrétariat du Réseau "Sortir du nucléaire," Lyon, France

Elizabeth Brown, East Bay Peace Action, Albany, California, USA

Kateri Caron, Spokane, Washington, USA

Vina Colley, Portsmouth/Piketon Residents for Environmental Safety and Security, McDermott, Ohio, USA

David Close, Professor, Department of Physics, East Tennessee State University, USA

Mary Byrd Davis, Uranium Enrichment Project of Earth Island Institute, Georgetown, Kentucky, USA

Cyndy deBruler Executive Director, Columbia River United, Hood River, Oregon, USA

Greg deBruler, White Salmon, Washington, USA

Anushka Drescher, Ph.D., Berkeley, California, USA

Gordon Edwards, Ph.D., President, Canadian Coalition for Nuclear Responsibility, Montreal, Quebec, Canada
Nader Entessar, Professor of Political Science & International Studies, Spring Hill College*, Mobile, Alabama, USA

Eric Epstein, Three Mile Island Alert and EMFR Monitoring Group, Harrisburg, Pennsylvania, USA

Cathey E. Falvo, M.D., M.P.H., Program Director, International & Public Health Graduate School of Health Sciences, New York Medical College*, Valhalla, New York, New York, USA

Ansar Fayyazuddin, Assistant Professor of Physics, Stockholm University, Stockholm, Sweden

Martin Forwood and Janine Allis-Smith, CORE (Cumbrians Opposed to a Radioactive Environment), Barrow-in-Furness, Cumbria, UK

Michel Fremont, le CRILAN, Courcy, France

Surendra Gadekar, ANUMUKTI, Vedchhi, India

Sanghamitra Gadekar, ANUMUKTI, Vedchhi, India

Ann Harris, Director, We The People, Inc., of Tennessee, and Executive Director, Alliance for Public Health & Safety, Ten Mile, Tennessee, USA

Ruth M. Heifetz, M.D., M.P.H., Senior Lecturer, Department of Family and Preventive Medicine, School of Medicine, University of California-San Diego*, San Diego, California, USA

Ira Helfand, M.D., Co-Founder and Past President, Physicians for Social Responsibility, USA

Felicity Hill, Director, U.N. Office for Women's International League for Peace and Freedom, New York, USA

Laura Hunter, Environmental Health Coalition, San Diego, California, USA

Joe Jaffe, retired physicist, San Diego, California, USA

Carol Jahnkow, Executive Director, Peace Resource Center of San Diego, San Diego, California, USA

Chuck Johnson, Director, Center for Energy Research, Salem, Oregon, USA

Judith Johnsrud, Director, Environmental Coalition on Nuclear Power, State College, Pennsylvania, USA
Deb Katz, Citizens Awareness Network, Shelbourne Falls, Massachusetts, USA

Robin Klein, President, Hanford Action of Oregon, Portland, Oregon, USA

Prof. Dr. Wolfgang Koehnlein, President, German Society for Radiation Protection, and Institut fuer Strahlenbiologie, Westfaelische Wilhelms-Universitaet, Muenster, Germany

Cathy Lemar, Military Toxics Project, Lewiston, Maine, USA

Bernard Lindberg, Chairperson, Mankato Area Environmentalists, Mankato, Minnesota, USA

John Loretz, Executive Editor, Medicine and Global Survival*, Cambridge, Massachusetts, USA

Michael J. Manetas, Department of Environmental Resources Engineering, Humboldt State University, Arcata, California, USA

Robert A. McFarlane, M.D., Clinical Professor Emeritus of Surgery, Oregon Health Sciences University, Portland, Oregon, USA

Janot Mendler, Director for Operations, GEF/UNDP International Waters:LEARN*, Boston, Massachusetts, USA

Robin Mills, Director, Maryland Safe Energy Coalition, Baltimore, Maryland, USA

Giorgio Nebbia, Professor Emeritus, Faculty of Economics, University of Bari*, Italy

Dale D. Nesbitt, Staff scientist, Lawrence Berkeley National Lab, Retired, California, USA

Andi Nidecker, Associate Professor, University of Basel, and Executive Council, Swiss Chapter of Physicians for Social Responsibility and International Physicians for the Prevention of Nuclear War, Switzerland

Baku Nishio and Hideyuki Ban, Co-directors, Citizens' Nuclear Information Center, Tokyo, Japan

Rudi H. Nussbaum, Ph.D., Professor Emeritus, Portland State University, for Northwest Radiation Health Alliance, Portland, Oregon, USA

Sonya Ostrom, Metro New York Peace Action Council, Brooklyn Heights Peace Action, Eastside Peace Action, Flatbush Peace Action, Greenwich Village Coalition for Peaceful Priorities, NOBSAC (North Bronx Social Action Committee), Shorefront Peace Committee, SNAP (Stop Nuclear Arms Proliferation), and Westside Peace Action, New York, New York, USA
David Ozonoff, M.D., M.P.H., Professor and Chair, Department of Environmental Health, Boston University School of Public Health, Boston, Massachusetts, USA

Perline, Ph.D., engineer and physicist, Paris, France

Carolyn Raffensperger, Science and Environmental Health Network, Windsor, North Dakota, USA

Bruce Reznik, Executive Director, San Diego BayKeeper, San Diego, California, USA

Norman Rubin, Director of Nuclear Research and Senior Policy Analyst, Energy Probe, Toronto, Ontario, Canada

Gladys Schmitz, Vice-chairperson, Mankato Area Environmentalists, Mankato, Minnesota, USA

Betty Schroeder, Co-Chair, Arizona Safe Energy Coalition, Tucson, Arizona, USA

Monique Sené, GSIEN, Orsay, France

Victor W. Sidel, M.D., Professor of Social Medicine, Albert Einstein College of Medicine, Bronx, New York, USA

Pamela Sihvola, Co-chair, Committee to Minimize Toxic Waste, California, USA

Norma Sullivan, retired college English professor, San Diego, California, USA

Dr. Jinzaburo Takagi, Citizens' Nuclear Information Center, Tokyo, Japan

Tim Takaro, M.D., Chair, Hanford Task Force, Washington Physicians for Social Responsibility, Seattle, Washington, USA

Alyn Ware, Consultant at Large, Lawyers' Committee on Nuclear Policy, New York, New York, USA

Harvey Wasserman, Citizens Protecting Ohio, Bexley, Ohio, USA

Carroll Webber, Ph.D., Greenville, North Carolina, USA

David Crockett Williams, Coordinator, Global Peace Walk Project, and Initiator, Global Emergency Alert Response, Tehachapi, California, USA

Steve Wing, Department of Epidemiology, School of Public Health, University of North Carolina*, Chapel Hill, USA
Alexei Yablokov, Center for Russian Environmental Policy and Program for Radioactive and Nuclear Safety by International Socio-Ecological Union, Moscow, Russia

Alla Yaroshinskaya, Yaroshinskaya Ecological Charity Fund, Moscow, Russia

**Signatories added after September 3, 1999:**

Robert Alvarez, Government Accountability Project, Washington, D.C., USA

Charles Barnett, Chair, Shut Down Sizewell Campaign, Suffolk, UK

Eulynda Toledo Benalli, First Nations North and South, Albuquerque, New Mexico, USA

Michael G. Bindner, Candidate for Council At-Large, D.C. Statehood Green Party*, Washington, D.C., USA

Rabbi Willa K. Bluesky, The Radiant Medicine Project, Kingman, Kansas, USA

Jacques Boucher, Peace and Disarmament Concern, Centre de ressources sur la non-violen, Montréal, Québec, Canada

Richard Bramhall, Low Level Radiation Campaign, Llandrindod, UK

Raymond Bristow, Rockford Green, Kingston upon Hull, UK

Chuck Broscious, Environmental Defense Institute, Moscow, Idaho, USA

Helen Caldicott, M.D., Founding President Physicians for Social Responsibility, Sydney, Australia

Nancy L. Casady, General Manager, Ocean Beach People's Organic Food Co-op, San Diego, California, USA

George Crocker, North American Water Office, Lake Elmo, Minnesota, USA

Bhanu Pratap Das, Peoples Democratic Forum, Bangalore, India

Merav Datan, International Physicians for the Prevention of Nuclear War*, Cambridge, Massachusetts, USA

Scott Denman, Safe Energy Communication Council, Washington, D.C., USA

Joe Dolce, New York City, New York, USA

Bruce A. Drew, Prairie Island Coalition, Minneapolis, Minnesota, USA
Jenefer Ellingston, DC Statehood Green Party, Washington, D.C., USA

Dennis Flaherty, President, Veterans for Peace UK, Beddau, Rhondda-Cynon-Taf, UK

Gregor Gable, Shundahai Network, Las Vegas, Nevada, USA


Anne Grieg M.D., National Council IPPNW/Norway, Horten, Norway

Wenonah Hauter, Director, Public Citizen's Critical Mass Energy Project, Washington, D.C., USA

Douglas Holdstock MD FRCP (Hon Sec), Medact, London, UK

Thomas Jandl, Bellona USA, Washington, D.C., USA

Marylia Kelley, Executive Director, Tri-Valley CAREs, Livermore, California, USA

Joan King, Decatur, Georgia, USA

Ziggy Kleinau, Coordinator, Citizens for Renewable Energy, Ontario, Canada

Paige Knight, President, Hanford Watch, Portland, Oregon, USA

Dave Kraft, Nuclear Energy Information Service, Evanston, Illinois, USA

Amy Lesser, Center for Environmental Citizenship, Washington, D.C., USA

Wendy MacLeod-Gilford and M E J Gilford, Blewbury Environmental Research Group, Carms, Wales, UK

Theresa McClenaghan, Counsel, Canadian Environmental Law Association, Toronto, Ontario, Canada

Dr. Pushpa Mehta, Denver, Colorado, USA

Zia Mian, Princeton, New Jersey, USA

Richard Miller, Policy Analyst, Paper, Allied-Industrial, Chemical and Electrical Workers Union (PACE), Washington, D.C., USA

Don Moniak, Program Director, Serious Texans Against Nuclear Dumping, Amarillo, Texas, USA
LeRoy Moore, Ph.D., Rocky Mountain Peace and Justice Center, Boulder, Colorado, USA

Carmel Mothersill, Radiation and Environmental Science Centre, Dublin Institute of Technology, Dublin, Ireland

Judy Norsigian, Program Director, Boston Women's Health Book Collective, Somerville, Massachusetts, USA

Richard Ochs, Ellen Barfield, Carol Solomon, and Kay Dellinger, Maryland Safe Energy Coalition, Baltimore, Maryland, USA

Tony and Carol Picou, MIsSION Project, Military Issue's Surfacing In Our Nation*, Toccoa, Georgia, USA

Bill Plummer, St. Paul, Minnesota, USA

Peggy Prince, Peace Action New Mexico, Santa Fe, New Mexico, USA

M. V. Ramana, Center for Energy and Environmental Studies, Princeton University, Princeton, New Jersey, USA

Indira P. Ravindran, Baltimore, Maryland, USA

Dana Richard, Washington D.C., USA

Susan H. Riordon, Atlantic Regional Chair, Canadian Peacekeeping Veterans Association, Yarmouth, Nova Scotia, Canada

Tracy Ann, Liam Raymond Terry, and Capt. Terry Riordon, Yarmouth, Nova Scotia, Canada

Ellen R. Robinson, Albuquerque, New Mexico, USA

Harry Rogers, Carolina Peace Resource Center, Columbia, South Carolina, USA

Rick Rothschild, SANE Nuclear Freeze Hawai`i, Honolulu, Hawai`i, USA

Susan Shaer, Executive Director, and Pat Ortmeyer, Field Director for Nuclear Waste Issues, Women's Action for New Directions, Cambridge, Massachusetts, USA

Tim Shaw, Free Range Network, Llanwrda, Carmarthenshire, UK

Dingli Shen, Fudan University, Shanghai, China

Pascal Signolet, Paris, France
E.J. Sternglass, J.M. Gould, JJ Mangano, and Janette Sherman, Radiation and Public Health Project, New York City, New York, USA

Cathie Sullivan, Los Alamos Museum Project (LAMP), Santa Fe, New Mexico, USA

Kitty Tucker, President, The Health & Energy Institute, Takoma Park, Maryland, USA

Seth Tuler, Social and Environmental Research Institute, Leverett, Massachusetts, USA

Dr. med. Martin Walter, Innere Medizin FMH, former president of IPPNW-Switzerland, Grenchen, Switzerland

Donald C. Whitmore, President, Third Millennium Foundation, Auburn, Washington, USA

Ruth Yarrow, Seattle, Washington, USA

*Affiliation provided for identification purposes only

Cc:
Members of BEIR VII Committee
Dr. Evan B. Douple, Director, Board on Radiation Effects Research
Dr. Stephen L. Simon, Board on Radiation Effects Research
Dr. E. William Colglazier, Executive Officer, National Academy of Sciences
Dr. Jerome Puskin, Radiation Studies Branch, Environmental Protection Agency
Dr. Richard B. Setlow, Chair, BEIR VII Phase I Committee
Mr. Charles Meinhold, President, National Council on Radiation Protection and Measurements
Professor R.H. Clarke, Chairman, International Commission on Radiological Protection