



# HEALTH PHYSICS SOCIETY

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*“Specialists in Radiation Safety”*

April 29, 1999

Mr. John A. Borrelli  
U.S. General Accounting Office  
441 G. St. NW  
HEHS/VA&MHC  
Washington, DC 20548

**KEITH H. DINGER, CHP**  
**President 1998 - 1999**

23 Prospect St.  
Somersworth, NH 03878  
Tel: (603) 692-4270  
Fax: (603) 692-3760  
email: kdinger@ttlc.net

Dear Mr. Borrelli:

It was a great pleasure for Dr. Bill Mills and I to be able to meet with you and George Lorenzen on April 8, 1999. We hope you found our discussion on the relationship of radiation exposure and cancer to be helpful. I sincerely apologize for taking this long to provide you with the follow-up information you requested.

My understanding is that you desire a list of primary scientific reports that would “back-up the opinions of the Society” on the relationship between radiation exposure and cancer. In addition, you would appreciate a list of scientific individuals who are knowledgeable in radiation health effects that the Government Accounting Office (GAO) could interview to broaden the scope of scientists, and scientific opinions. The request for other individuals was for a list of those that we felt would agree with Dr. Mills’ and my discussion and those that would have a contrary or different view.

I have enclosed what I consider to be responsive to this request. Regarding our discussion, we did discuss some Society Positions, and Dr. Mills and I did offer personal opinions on some issues. However, as I see it the basic issue about which you were interested, and about which we spent the vast majority of time discussing, was the relationship between radiation and cancer. That is, I saw us primarily trying to answer your question as to “what role does radiation dose play in determining if radiation causes a cancer.”

In that regard, I consider our presentation was simply “teaching” what consensus science does and does not know about radiation health effects. This material is not really an “opinion” of the Society, but is a matter of reports from consensus scientific committees. These are the reports I have listed in the enclosure. I have

also listed what I consider to be the relevant scientific assertions we presented that are derived from these reports. Although I have included the Society “opinion” that derives from these assertions, I can only provide names of scientifically knowledgeable individuals I feel agree with the reports and the assertions I have listed, without conclusion as to how they feel about our “opinion” of the non-presumptive nature of radiation and cancer.

Regarding scientific individuals that represent views or opinions that differ from what we presented, I am providing you two names. Both individuals have appropriate credentials and training to understand radiation and its effects. The views held by these two individuals cover the spectrum of scientific opinion that ranges from a view that low doses of radiation may actually be beneficial to one that low doses of radiation are more hazardous than represented by consensus science. The Society subscribes to the consensus science which is somewhere in the middle of this spectrum.

I hope this is helpful and responsive to your request. I want to reiterate the desire of the Health Physics Society to serve as a resource to the GAO in any matter relating to radiation or radiation safety. Please do not hesitate to contact me or Dr. Mills about this or any other matter.

Sincerely,

A handwritten signature in black ink that reads "Keith H. Dinger". The signature is written in a cursive style with a large, prominent "K" and "D".

Keith H. Dinger, CHP

Enclosure

Enclosure to Letter from K. H. Dinger to J. A. Borelli dated April 29, 1999

**REQUEST: List of primary scientific reports that would back-up the opinions of the Society on the relationship between radiation exposure and cancer and a list of scientific individuals who are knowledgeable in radiation health effects that the GAO could interview to broaden the scope of scientists.**

Assertions considered scientific fact that are not, therefore, “opinions” of the Society

1. Health effects have primarily only been observed in populations exposed to high doses at high dose rates.
2. The Life Span Studies of the Japanese survivors, exposed at high doses and high dose rates, form the most significant basis for estimates of risk from radiation.
3. The risk (i.e., chance) that any given cancer is related to a given radiation exposure depends on the amount of that exposure (i.e., dose) as well as other factors such as type of cancer, age at exposure, gender, and time since exposure.
4. The lowest doses at which an increase in any type of cancer is attributed to radiation exposure in the Japanese studies is greater than the 5 rem (0.05 Sv) used by the VA as a screening level for compensation evaluations.
5. The risks on a “per dose basis” of exposure to low dose, low dose-rates are less than those due to high dose, high dose-rates.

From these scientific facts the Society makes the opinion that there is no justification for assuming a presumptive causation of a cancer without consideration of all factors listed in #3 above, including dose.

**Scientific Reports supporting these facts:**

Health Effects of Exposure To Low Levels of Ionizing Radiation (BEIR V), Committee on the Biological Effects of Ionizing Radiation, Board on Radiation Effects Research, Commission on Life Sciences, National Research Council, National Academy Press, 1990.

Sources and Effects of Ionizing Radiation (UNSCEAR 1988, 1993, 1994), United Nations Scientific Committee on the Effects of Atomic Radiation, No. E.88.IX.7, E.94.IX.2, and E.94.IX.11 (respectively), United Nations, New York

Risk Estimates For Radiation Protection (NCRP 115), National Council on Radiation Protection and Measurements, 1993

NOTE: The above reports are rather scientific and technical in their content and style. For an authoritative, but more “layman” oriented discussion the following “classic” scientific article is recommended. Although the risk estimates have been changed since the publication of this article, it is still consider a classic in describing the basic science of radiation health effects.

The Biological Effects of Low-Level Ionizing Radiation by Arthur C. Upton, Scientific American, Vo. 246, No. 2, pg 41 – 49, Feb. 1982.

**Scientific Individuals Knowledgeable in these Reports that probably agree with Assertions 1 thru 5 above:**

Charles Meinhold, President, NCRP  
516-344-4209 (Brookhaven National Lab) or  
301-657-2652 (NCRP)

Arthur C. Upton, Environmental and Occupational Health Sciences  
Institute, Piscataway, NJ

Gilbert W. Beebe  
National Cancer Institute, Bethesda, MD  
301-496-5067

Otto G. Raabe, Professor-Emeritus  
Institute of Toxicology and Environmental Health  
University of California – Davis  
530-752-7754

Marvin Goldman, Professor-Emeritus  
VM Radiological Sciences  
University of California – Davis  
530-752-1341

Kenneth L. Mossman, Professor  
Arizona State University  
602-965-0584

**Scientific Individual Knowledgeable in these Reports that probably does not agree with Assertions 4 and 5 above, believing there is a Threshold below which there is no cancer risk and below which there may be a Beneficial effect.**

Myron Pollycove  
301-415-7884

**Scientific Individual Knowledgeable in these Reports that probably does not agree with Assertions 4 and 5 above, believing effects are observable below 5 rem and the risk at low dose, low dose-rate is greater than that projected by these reports.**

John Gofman, Professor-Emeritus  
University of California