NRC Opens Comment Period on LNT Theory and Protection Standards

On June 23 the Nuclear Regulatory Commission (NRC) published in the *Federal Register* (2015;80:35879–35872) a notice of receipt of petitions for rulemaking requesting that the agency amend its "Standards for Protection Against Radiation" (10 CFR 20) and move the basis of those regulations away from the linear no-threshold (LNT) model of radiation protection toward a model taking radiation hormesis into account. The notice contains summaries and extracts of the original petitions as well as a link for public comments. All comments are to be submitted by September 8, 2015.

The petitions were submitted separately in February 2015 by Carol S. Marcus, PhD, MD, David Geffen School of Medicine at the University of California Los Angeles; Mark L. Miller, CHP, Sandia National Laboratories (Albuquerque, NM); and Mohan Doss, MD, Fox Chase Cancer Center (Philadelphia, PA). The NRC "is examining the issues raised in these petitions to determine whether they should be considered in rulemaking," and public comment will be considered in determining the need for changes in current standards.

Marcus, who was a member of the NRC Advisory Committee on the Medical Uses of Isotopes from 1990 to 1994, stated in her petition that "there has never been scientifically valid support for this LNT hypothesis since its use was recommended by the U.S. National Academy of Sciences Committee on Biological Effects of Atomic Radiation (BEAR I)/Genetics Panel in 1956" and that "the costs of complying with these LNT-based regulations are enormous." Miller noted that the use of the LNT hypothesis has "led to persistent radiophobia." Doss, whose petition was filed on behalf of numerous members of Scientists for Accurate Radiation Information, argued more directly for the potential hormetic effects of low-dose radiation (LDR). He noted that regulations based on the LNT theory have "had a major detrimental effect on public health, since they have prevented the study of LDR for controlling aging-related diseases such as cancer, Alzheimer's disease, Parkinson's disease, etc. in spite of studies showing the promise of LDR for the diseases."

The NRC summarized the petitions as follows: "The petitioners request that the NRC amend part 20 of title 10 of the *Code of Federal Regulations* (10 CFR), 'Standards for Protection Against Radiation,' based on new science and evidence that contradicts the LNT hypothesis and request that the NRC greatly simplify and change 10 CFR part 20 to take into account the 'vast literature demonstrating no effects or protective effects at relatively low doses of radiation'."

Marcus's lengthy and carefully documented petition noted of the LNT hypothesis that "this ultra-simplistic concept assumes that all radiation absorbed doses, no matter how small, have a finite probability of causing a fatal cancer" and that the "use of the LNT assumption enables regulators to feel justified in ratcheting down permissible worker and public radiation levels, either through actual dose limits or use of the 'as low as reasonably achievable' (ALARA) principle, giving the illusion that they are making everyone safer (and creating ever increasing workloads for themselves and their licensees)."

Marcus requested that the NRC "greatly simplify and change Part 20 to take radiation hormesis into account." She recommended the following changes to 10 CFR Part 20, with similar changes recommended by Miller and Doss.

1. Worker doses should remain at present levels, with allowance of up to 100 mSv (10 rem) effective dose per year if the doses are chronic.
2. ALARA should be removed entirely from the regulations as it makes no sense to decrease radiation doses that are not only harmless but may be hormetic.
3. Public doses should be raised to worker doses, as these low doses may be hormetic. Why deprive the public of the benefits of low dose radiation?
4. End differential doses to pregnant women, embryos and fetuses, and children under 18 years of age.

Marcus concluded her petition by stating: "Obviously there will have to be many other changes to NRC regulations when 10 CFR Part 20 is brought up to present scientific standards. Examples include the medical regulations and low level radioactive waste regulations. But it all needs to start with ending reliance on the LNT model."

The Newsline Editor urges readers to submit comments by September 8. The complete *Federal Register* article is available at https://federalregister.gov/a/2015-15441 and contains a direct link box for submitting formal comments. Additional ways to submit comments include: e-mail to Rulemaking.Comments@nrc.gov (include Docket ID NRC-2015-0057 in the subject line); fax to Secretary, U.S. Nuclear Regulatory Commission at 301-415-1101; and mail to Secretary, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, ATTN: Rulemakings and Adjudications Staff.