HPS Specialists in Radiation Protection
HEALTH PHYSICS SOCIETY

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July 16, 2025

***Subject**: Health Physics Society Presentation to US NRC Public Meeting on Executive Order 14300 Section 5(b) - Reconsidering the NRC's Radiation Protection Framework*

The Health Physics Society appreciates the opportunity to participate in the NRC's stakeholder public meeting held on July 16, 2025, to discuss Section 5(b) of Executive Order 14300. The Health Physics Society (HPS), formed in 1956, is a scientific organization of professionals who specialize in radiation safety. Its mission is excellence in the science, practice, communication, and application of radiation safety and protection. Its members represent all scientific and technical areas related to radiation safety, including academia, government, medicine, research and development, analytical services, consulting, and industry in all 50 states and the District of Columbia. The HPS is chartered in the United States as an independent nonprofit scientific organization and, as such, is not affiliated with any government or industrial organization or private entity.

The topics discussed today are of great interest to the radiation safety profession. On June 9 and 10, 2025, HPS partnered with the National Council on Radiation Protection and Measurements (NCRP) to hold two open forums to hear from radiation safety professionals and other interested parties on the challenges and opportunities posed by the Executive Orders involving radiation protection and to hear their ideas on the path forward for radiation safety. Nearly 800 people attended the first forum and nearly 600 attended the second. The vast majority of attendees were HPS members. Two professors at the University of Alabama - Birmingham summarized the information gathered during those public forums and are preparing a paper for publication in a scientific journal. This information may prove to be valuable to NRC along with the stakeholder comments received on July 16.

On behalf of the HPS Board of Directors, I offer the following comments specific to Executive Order 14300 Section 5(b) - Reconsidering the NRC's Radiation Protection Framework. The Health Physics Society has established formal positions regarding the linear no-threshold model (LNT) in several HPS position statements. The following points are taken directly from these published statements.

- HPS concurs with the National Academies as documented in the BEIR VII report that below levels of about 0.1 Sv above background from all sources combined, the observed radiation effects in people are not statistically different from zero.[1]
- HPS concurs with NCRP's Report No. 136 that, because of statistical uncertainties in biological response at or near background levels, the LNT hypothesis cannot provide reliable projections of future cancer incidence from low-level radiation exposures.[1]
- Substantial scientific data indicate that the LNT model of radiation effects oversimplifies the relationship between dose and response.[1]

[1] PS010-4, Radiation Risk in Perspective, February 2019, https://hps.org/wp-content/uploads/2024/12/radiationrisk.pdf accessed on 10 July 2025

- It should also be recognized that credible scientific studies may lead to honest differences in data interpretation and support of competing theories and that calculations based on different theories may lead to risk estimates that are significantly different. For instance, the radiation protection literature is filled with differing views as to the shape of the radiation dose-response curve at low doses and dose rates. Some data support a linear no-threshold model, whereas other data support models that predict lower estimates of risk and perhaps even a threshold below which no detectable radiation health risk exists.[2]
- This relationship of increasing likelihood of disease with increasing dose has only been observed for doses greater than approximately 0.1 Sv. The likelihood of radiation-induced disease below this level, if it exists at all, is so small that it is not measurable, it is not a matter of scientific fact, and it can only be estimated utilizing hypothetical mathematical dose-response models.[3]

The importance of continued federal support for research into the health effects of low level radiation exposure such as is currently being conducted through the Million Person Study[4] is critical to enhancing our understanding of the use of various mathematical models for estimating risk at occupational and environmental levels.

Intermingled with the current use of the LNT model in regulating radiation exposure is the concept of maintaining radiation exposures as low as reasonably achievable (ALARA). The HPS has also established the following positions on the ALARA principle, as described in the official position statements.

- Radiation exposures of the public from controllable sources should be maintained as low as reasonably achievable (ALARA), economic and social factors being taken into account. However, ALARA should not be quantified with respect to dose goals or monetary cost, e.g., dollars per person-sievert.[5]
- The most reliable studies of the effects of radiation exposure at the low levels received by occupational workers have not been able to detect adverse health effects associated with lifetime exposures smaller than approximately 0.1 Sv.[3,6] Even at the higher doses, the studies are not all consistent. However, inherent limitations of these studies leave open the possibility there are small undetected risks at the low levels of exposure experienced in the workplace and in the environment.[3]

The NRC and other federal agencies have established limits on occupational and public radiation exposure. The HPS position on these dose limits is also documented in our position statements. HPS concludes:

- The implementation of radiation safety standards and regulations has been responsible and adequate in providing for a safe industry, taking into account changes in occupational work practices over the last 50 years.[5]

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[2] PS008-2, Uncertainty in Risk Assessment, February 2013, https://hps.org/wp-content/uploads/2024/12/riskassessment_ps008-2.pdf, accessed on 10 July 2025
[3] PS014-0, Compensation for Diseases That Might Be Caused by Radiation Must Consider the Dose, March 2001, https://hps.org/wp-content/uploads/2024/12/compensation_ps014-0.pdf, accessed on 10 July 2025
[4] https://www.millionpersonstudy.org/ accessed on 10 July 2025
[5] PS005-3, Ionizing Radiation Safety Standards for the General Public, February 2009, https://hps.org/wp-content/uploads/2024/12/publicdose_ps005-3.pdf, accessed on 10 July 2025
[6] PS013-1, Occupational Radiation Safety Standards and Regulations Are Sound, July 2010, https://hps.org/wp-content/uploads/2024/12/occupationaldose_ps013-1.pdf, accessed on 10 July 2025

- Public radiation safety standards should be based on specified values of dose rather than hypothetical estimates of risk. These standards should be expressed as an effective dose resulting from all exposure pathways.[4]
- The sum of effective dose(s) to individual members of the public from exposure to controllable sources—with the exception of occupational exposure, accidental releases, and indoor radon—normally should be limited to 1 mSv in any year. In special (infrequent) circumstances, an effective dose up to 5 mSv in a year may be permitted.[4]
- Constraints should be applied to each controllable source of public exposure to ensure that the dose limit for an individual from all controllable sources combined will be met. An effective dose of 0.25 mSv in any year to individual members of the public is a suitable source constraint in most cases. In special circumstances, an effective dose higher than 0.25 mSv in a year may be permitted.[4]
- The Health Physics Society supports the establishment of an acceptable dose of radiation of 1 mSv per year above the annual natural radiation background. At this dose, risks of radiation-induced health effects are either nonexistent or too small to be observed.[4]
- The Health Physics Society recommends that regulations intended to achieve very low levels of radiation exposure should take full account of the uncertainties in risk estimates; otherwise, they may result in enormous expenditure of limited resources with no demonstrable public health benefits.[2]

A particular challenge facing the radiation safety profession and other industry and public stakeholders is related to the various different radiation protection regulations that exist in the United States. The HPS position on harmonized regulations is as follows.

- The Health Physics Society remains concerned with the inconsistent application of risk assessment in the establishment of radiation protection regulations. These regulations are not well coordinated among federal agencies and, therefore, create public confusion and concern.[2]
- A single, independent U.S. federal agency shall have the responsibility and authority to establish all ionizing radiation safety standards for all controllable sources of occupational and public exposures.[7]

An opportunity exists to harmonize radiation protection regulations. While work progresses toward improving the radiation protection regulatory framework, it is the HPS position that radiation safety standards be consistent with the recommendations of the International Commission on Radiological Protection (ICRP), the National Council on Radiation Protection and Measurements (NCRP), and scientific consensus standards.[6]

On behalf of the Health Physics Society I thank the NRC for holding this public meeting to obtain stakeholder input. Please contact me if you have any questions regarding the positions of the Health Physics Society or if the HPS can be of service.

Sincerely,

HPS President, 2025-2027

[7] PS004-1, Compatibility in Radiation Safety Regulations, July 2007, https://hps.org/wp-content/uploads/2024/12/compatibility_ps004-1.pdf, accessed on 10 July 2025