

The Boice Report #57



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Overflowing Pipeline of Publications for NCRP in 2017



Kimberly Gaskins enthusiastically sang the National Anthem; HM3 Tomasz Kotowski assists (Walter Reed National Military Medical Center). Photo courtesy of Casper Sun

Your National Council on Radiation Protection and Measurements (NCRP) continues to survive and thrive because of the stellar professionals who volunteer their time and efforts in the nation's interest. For example, the 2017 NCRP Annual Meeting—[“Emergency Preparedness for Nuclear Terrorism”](#)—was so successful that a commentary will be prepared summarizing the gaps and possible solutions to fill them (see Armin Ansari's comprehensive summary of the meeting on [the cover](#) of this newsletter). If you're in a hole, stop digging and start filling (apologies to Will Rogers)! The annual meeting got off to [a rousing patriotic start](#) with the Joint Armed Forces Honor Guard from the military district of Washington, DC, presenting the colors (photo at end), and the electrifying singing of our National Anthem by Kimberly Gaskins of the U.S. Nuclear Regulatory Commission. NCRP has a vision for the radiation protection needs of the nation. Here's what to expect in 2017—the pipeline of publications is overflowing!

Guidance on Radiation Dose Limits for the Lens of the Eye. Right out of the gate is NCRP Commentary No. 26, [“Guidance on Radiation Dose Limits for the Lens of the Eye.”](#) Scientific Committee (SC) 1-23 provides the latest guidance on lens dose and serious opacities and cataracts. Current epidemiologic evidence was scrutinized, animal models and mechanistic possibilities evaluated, ways to measure and estimate dose to the lens of the eye assessed, challenges in implementation covered, and cost considerations touched upon, i.e., whether implementation costs are commensurate with the level of protection afforded. NCRP recommends that the annual dose limit for occupational exposures of the lens of the eye be reduced to 50 mGy. [But there's more to be done](#), including research to understand the mechanisms of cataract development, improvements to dosimetry and optimization techniques, completion of high-quality epidemiologic studies, and development of medical countermeasures.

Biological Effectiveness of Photons as a Function of Energy. [SC 1-20](#) has evaluated whether [biological effectiveness depends on the energy](#) of low linear energy-transfer (LET) radiation (i.e., photons and electrons). This dependence is relevant for estimating cancer risk from mammography x rays as well as certain occupational and public exposures, including those to tritium. To estimate relative biological effectiveness (RBE) for lower energies, probability density functions were developed and combined using a Bayesian mathematical technique. Brave new world!

Central Nervous System (CNS) Effects From Space Radiation. [SC 1-24](#) published a commentary on [CNS considerations from galactic cosmic rays when going to Mars](#). The concern is whether high-atomic-number, high-energy (HZE) radiation (e.g., ^{56}Fe ions) emanating from supernova explosions can damage the human brain so that the mission would be compromised or that late effects, e.g., Alzheimer's disease, could develop. A [full report](#) is under way.

Epidemiology and LNT. The last comprehensive look by NCRP at the linear no-threshold (LNT) model used for radiation protection was [Report No. 136](#), chaired by Arthur Upton in 2001. In support of [Council Committee \(CC\) 1](#), charged with [updating protection guidance](#) for the United States, [SC 1-25](#) is preparing a commentary to be published this year that evaluates recent epidemiologic studies as to whether they support the [LNT model](#) as used in radiation protection today.

Radiation Safety Aspects of Nanotechnology. [SC 2-6](#) has evaluated whether smallness matters in radiation protection. Nanotechnology deals with dimensions between about 1 and 100 nm. Radioactive nanoparticles are encountered in medicine, in industry, and in the environment. Report No. 176 on “Radiation Safety Aspects of Nanotechnology” was just published and will be [available shortly](#).

Radiation Safety of Sealed Radioactive Sources. [SC 2-7](#) has prepared comprehensive guidance on [radiation safety of sealed radioactive sources](#) used in occupational settings. The loss of control of high-activity sources can result in fatal doses. Inadequately sealed sources that fail can spread contamination. Sealed sources could be used for terrorist purposes. Cradle-to-grave guidance is provided on safe handling, tracking, and control. Lessons learned from past mistakes will be addressed. This guidance will be available later this year.

Emergency Responder Dosimetry. [SC 3-1](#) will issue a report this year on [dosimetry guidance for emergency responders](#). New York City approached NCRP on dosimetry issues “after the bomb goes off in Central Park.” The report includes guidance for both urban and rural areas. For example, it will provide guidance on how to determine doses when personal dosimetry is incomplete or not available. A companion commentary is being developed that focuses on operational implementation. It will be short, concise, operational, and understandable. When firefighters, police, bus drivers, and Samaritans are called to action, there is no time to read a 300-page report!

Radiation Protection in Dentistry. [SC 4-5](#) has provided a “second edition” of [NCRP Report No. 145](#) published in 2003. Imaging modalities in dentistry have evolved over the past 10 years, including cone-beam computed tomography, digital radiography, and handheld dental x-ray units. No formal guidelines exist in the United States on safe and effective use of these technologies. The report will be [available shortly](#).

Communicating Radiation Risks for Studies Involving Human Subjects: Guidance for Researchers and Reviewing Bodies. [SC 4-7](#) will provide guidance to researchers and [institutional review boards](#) for studies involving human subjects. Guidance will cover assessing proper use of radiation, estimating risk, optimizing radiation dose, and formulating informed consent statements with consistent, comprehensible, and accurate language. The report is currently out for Council and public review.

U.S. Radiation Workers and Nuclear Weapons Test Participants Radiation Dose Assessment. [SC 6-9](#) is completing a comprehensive volume on radiation dose assessment for a wide range of exposure scenarios encountered in epidemiologic studies. Specific guidance is given for the [Million Person Study](#), which includes [Manhattan Project](#) workers, [atomic veterans](#), [nuclear utility workers](#), industrial radiographers, and early medical workers. The report is under final review.

Others in 2017. The proceedings of last year’s annual meeting—“[Meeting the Needs of the Nation in Radiation Protection](#)”—was published. The [Boice Report](#) continues. A special journal issue in

memory of Bill Morgan will be published, based on [symposia held at the 2016 Radiation Research Society Annual Meeting](#). In late 2017 or early 2018, the [2017 Annual Meeting](#) proceedings, a report from CC-1 (“[Radiation Protection Guidance for the United States](#)”) and a commentary from CC-2 on the [current status and adequacy of the radiation protection workforce \(WARP\)](#) will be published.

NCRP continues to strive for the good of the nation [in all things radiation and protection](#). We have a broad view and vision for the future, as seen in the pipeline publications above. “*You cannot escape the responsibility of tomorrow by evading it today*” (Abe Lincoln). Please help!



2017 NCRP Annual Meeting opens with the Joint Armed Forces Honor Guard from the military district of Washington, DC (6 March 2017)
Photo courtesy of Casper Sun